Archiving Vibration Data in Machine Analyst

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Introduction

Archiving vibration data is a key part of a reliability maintenance program, and in many cases, an auditable ISO requirement. This is a thorough description of how to configure Machine Analyst for various types of automatic archiving and manual archiving. It highlights Machine Analyst improvements over the PRISM4 software package and details examples for the ease of use of Machine Analyst's archiving features.

Note: Archiving is most practical when used to store data collected from on-line systems, such as SKF's LMU, MIM or CMU. However, it is now possible to automatically archive data from other data acquisition devices (DADs).

Why use archiving?

In addition to following industry standards or company policy, archiving provides the vibration analyst with some useful advantages:

- The analyst does not have to manually delete old data.
- Comparisons of previously stored data can easily be made to the most recently stored measurement data.
- Archiving simplifies the viewing of data, reducing clutter on plots for more effective analysis.

Archiving is also used to store data for a particular component of your machine or process. For example, the vibration data collected for a felt on a paper machine may be archived independently from the rest of the vibration data (i.e., bearings) once the felt is replaced.

Improvements over PRISM4 archiving

Machine Analyst has several improvements over PRISM4 that expand archiving functionality. In PRISM4, measurement management was based upon a user-defined storage depth configured during the POINT setup. Machine Analyst supports this capability, but also supports a management scheme that is based on time schedules.

Schedule classification

Machine Analyst expands on the archiving concept by providing different types of archiving based on length of time or the number of measurements:

- Short term archiving
- Long term archiving
- Unscheduled data archiving

One dialog box for both data collection and archiving schedules

In PRISM4, the data collection schedule for a given POINT was set in the POINT setup dialog box. Automatic archiving for PRISM4 OLS was set using a separate dialog box (see **figs. 1** and **2**).

Note that there is an edit box for the POINT's *storage depth*. PRISM⁴ only allowed the user to store up to 999 measurements per POINT. Additional measurements would force the first measurements to be lost. As we will see later in this paper, Machine Analyst gives the user much more archiving flexibility with fewer limitations.

In Machine Analyst, both the data collection schedule and the archiving of data are handled from within a single dialog, as shown in **fig. 3**.

In **fig. 3**, there are four field groups, each representing its own archiving bin. The first is **Data collection**, which specifies how often data should be collected from the DADs, and how long to keep this current data before archiving or discarding it. Collected data can then be archived in the **Short term archive** and **Long term archive** bins. The **Unscheduled data** bin is typically used for on-line data that is in alarm.

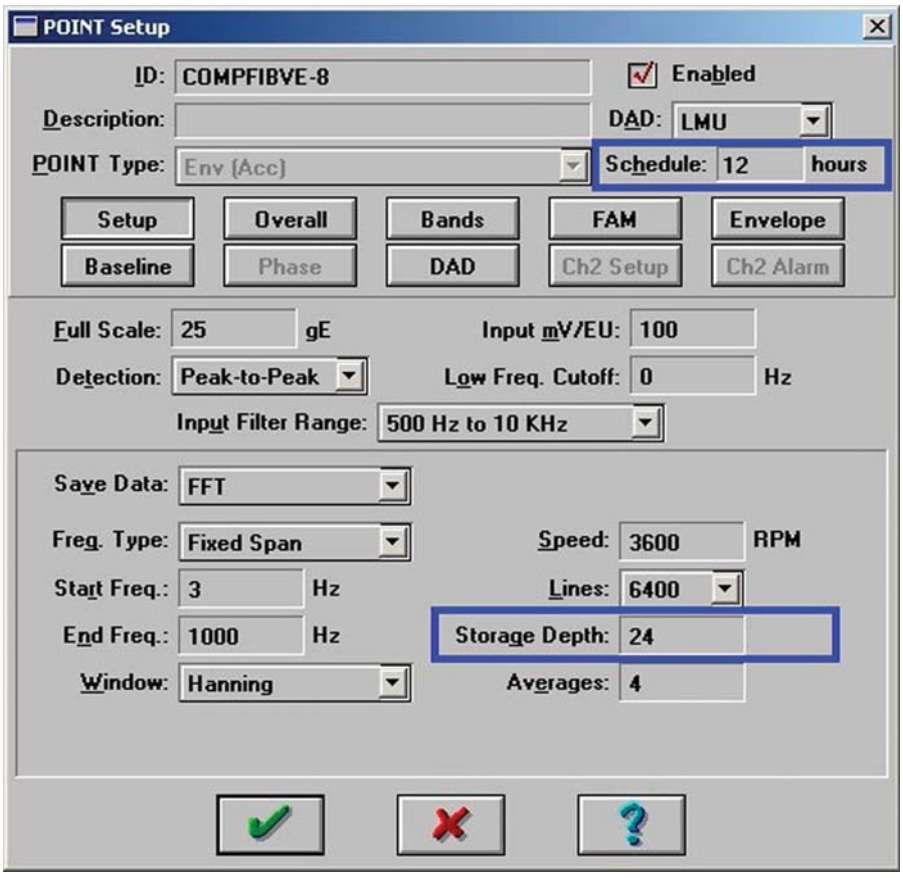

Figure 1. PRISM⁴ POINT Setup dialog.

Data collection fields

The POINT will be tagged as overdue for data collection if the time range between the current date (today) and the last data collection date is longer than the specified **Take data every** setting.

When the specified time from data collection elapses, and a scheduled archive process is performed, the measurement is typically moved from the current data bin into the "short term archive" bin (or discarded) as specified in the **Short term archive / Archive data every** field.

The **Keep current data for** field determines the length of time a measurement is kept before it is archived. For example, using an SKF Microlog DAD, you may select to "take data every 30 days" and "keep current data for 1 year". If you use Machine Analyst's Scheduler feature to schedule an archiving process every month, no archiving will take place for the first year. After the first year, on a monthly basis, all measurement records in the "current data" bin whose date and timestamp is older than one year from the current date will either be placed in the "short term archive" bin (if short term criteria are met) or discarded.

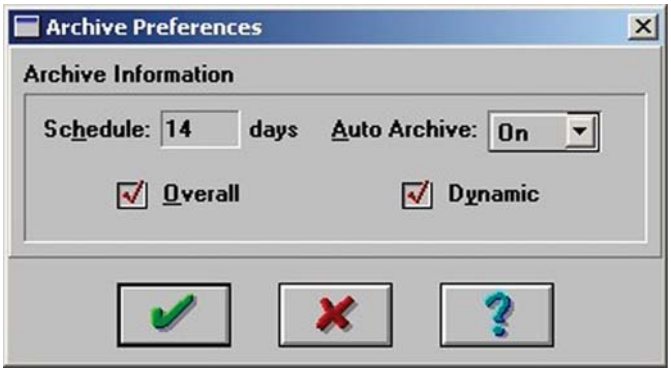

Figure 2. PRISM⁴ OLS automatic archive dialog.

Short term archive fields

The ***Archive data every*** field determines when data leaving the "current data" bin is archived in the "short term archive" bin. The numerical value you provide will indicate how often data leaving the "current data" bin is stored in the "short term archive" bin. The short term archive is optional, and Scheduler can be set up such that current data is archived directly into the long term bin, if desired.

As scheduled archives occur, measurements leaving the "current data" bin are accepted into the "short term archive" bin only if this ***Archive data every*** setting has expired since the last measurement was stored in the "short term archive" bin. Otherwise, they are discarded, thus reducing the amount of data stored.

The ***Keep archive for*** field allows you to specify how long to keep (store) the measurement record in the "short term archive" bin. When the specified time of storage elapses and a scheduled archive process is performed, the measurement is typically moved from the "short term archive" bin into the following "long term archive" bin (or discarded) as specified in the following ***Long term archive*** fields.

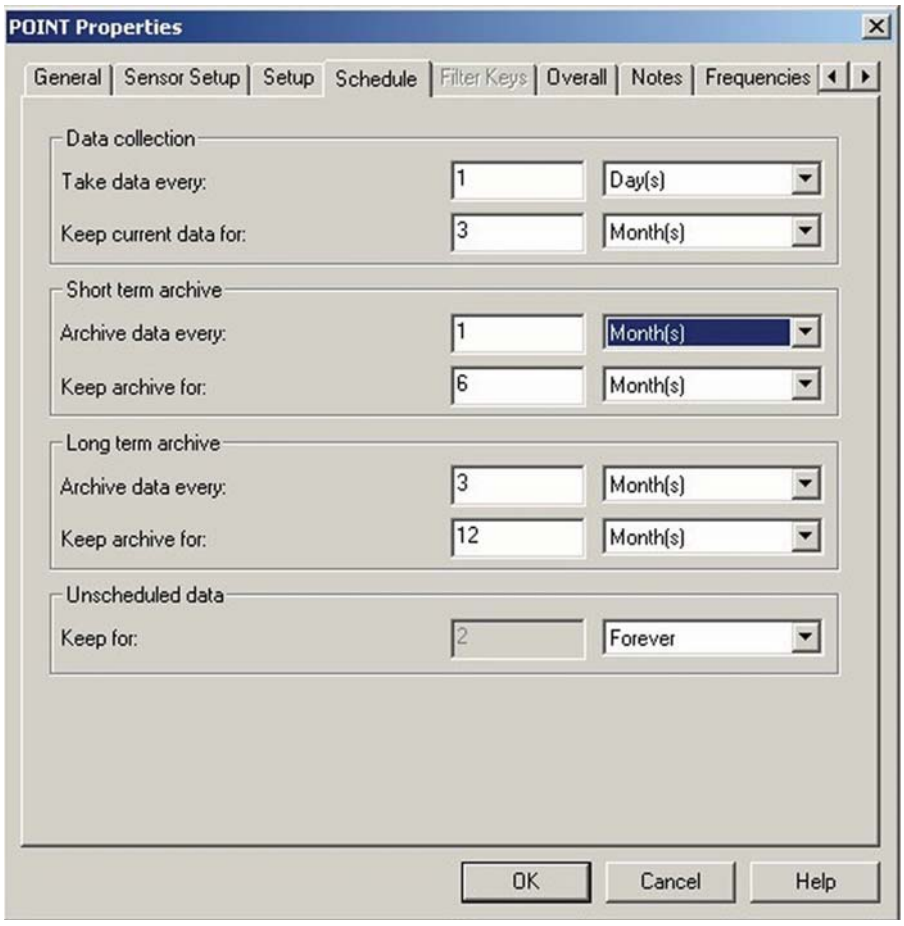

Figure 3. Machine Analyst POINT Properties/Schedule tab.

Long term archive fields

The long term archiving process is similar to the short term archive process. The ***Archive data every*** field allows you to specify when data leaving the "short term archive" bin is archived in the "long term archive" bin. The number you enter determines how often data leaving the "short term archive" bin is stored in the "long term archive" bin. As scheduled archives occur, measurements leaving the "short term archive" bin are accepted into the "long term archive" bin if this ***Archive data every*** setting has expired since the last measurement was stored in the "long term archive" bin.

The value given in the **Keep archive for** field indicates how long to keep (store) the measurement record in the "long term archive" bin. When the specified time of storage elapses and a scheduled archive process is performed, the measurement is then discarded.

Unscheduled data fields

This last group allows you to specify how long you would like to keep data that is in alarm. In on-line DAD systems, alarm data is automatically placed in the "unscheduled data" bin. The value you provide determines how long alarm data is stored in the alarm data bin before it is discarded.

Fig. 4 graphically illustrates the relationship between current, short term and long term data archiving, using the example setup previously shown in **fig. 3**.

Automatic and manual archival for DAD types

Machine Analyst allows the user to set up automatic archiving in addition to performing manual archiving. Automatic archiving was previously only available with PRISM⁴ OLS (on-line system); the standard PRISM⁴ only allowed the user to manually archive data.

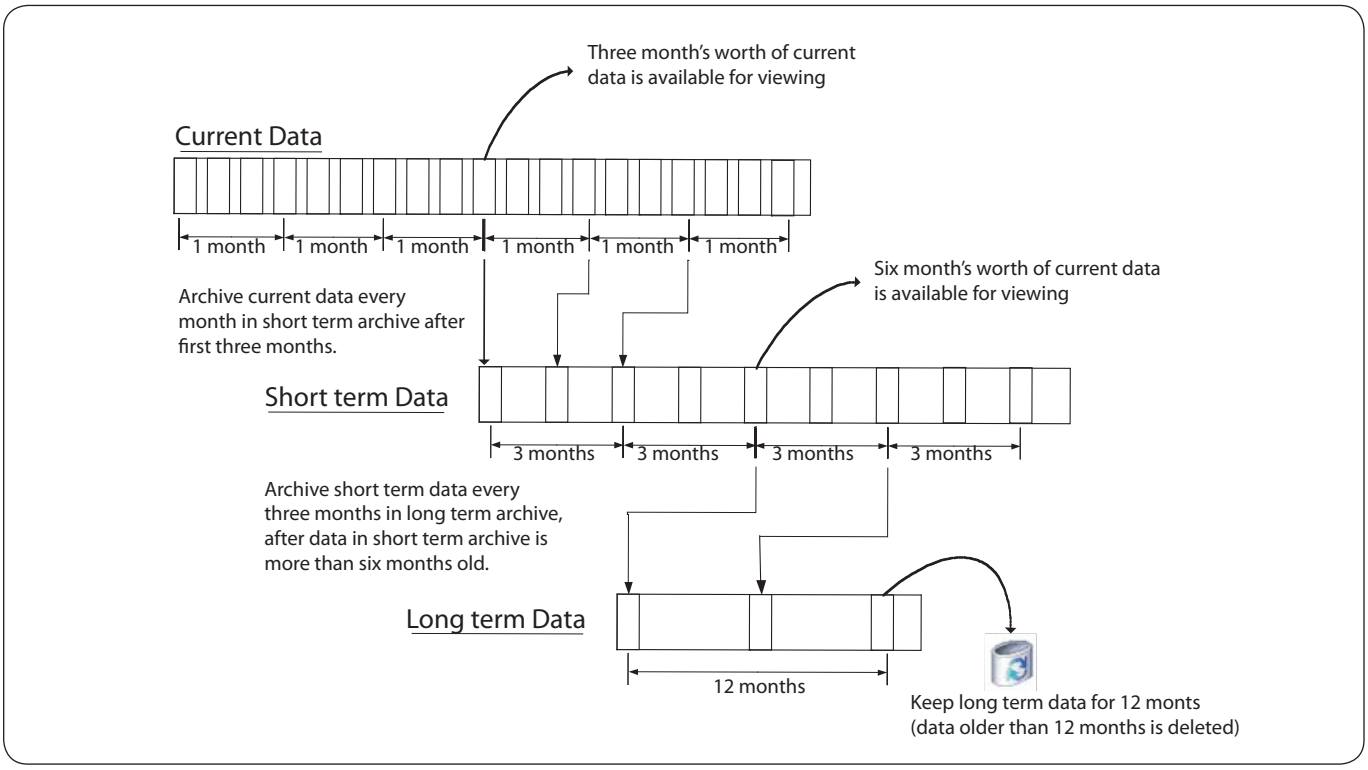

Figure 4. Timeline example, based on the setup shown in fig. 3.

Duration	Number of measurements in current	Number of measurements in short term	Number of measurements in long term	Comment
30 days	30	0	0	Current data only.
80 days	80	0	0	Current data only.
100 days	90	1	0	Measurements 10 to 100 are current. First measurement short term archived. Eight other measurements deleted.
150 days	90	2	0	Measurements 60 to 150 are current. Measurements 31 and 1 are short term archived. All others deleted.
210 days	90	3	1	Measurements 120 to 210 are current. Measurements 31, 61 and 91 are short term archived. Measurement 1 is long term archived. All others deleted.
360 days	90	3	2	Measurements 270 to 360 are current. Measurements 181, 211, 241 are short term archived. Measurements 1 and 91 are long term archived.

Table 1. Data archiving summary for example shown in fig. 4.

How to archive data in Machine Analyst

Data archival in Machine Analyst can be accomplished automatically or manually. Automatic archiving can be set up and maintained various ways:

- Individual POINT schedule
- Modify by attribute
- Event Scheduler wizard

Individual POINT schedule

Select the **POINT Properties** dialog's **Schedule** tab to access the data collection and archiving setup screen; this method is identical to that previously described and shown in **fig. 3**.

Modify by attribute (schedule)

Machine Analyst provides greater flexibility with a feature called "Modify by Attribute". With this feature, the user can configure both the data collection and archiving schedules for an entire group of POINTs, Machines or Sets. This saves the user time during the initial database setup and with future setup modifications.

This method is especially useful for modifying the archiving schedule on POINTs that are already set up. To use this feature:

- Select (using a single mouse click) the Machine or Set that contains the group of POINTs you wish to modify.
- Then from the File menu, select **Edit/ Attributes**. This displays the **Modify By Attribute** dialog.

Data collection and data archival schedules are found in the hierarchy under **General Settings/Schedule**, as shown in **fig. 5**. The left side of the dialog lists the various attributes; the right side shows selected Machines, Sets and POINTs and their attribute values.

Once the user selects an item from the list on the right, the **Edit** and **Set All** buttons become active. Click the **Edit** button to display the **POINT Properties/Schedule** tab, as previously shown in **fig. 3**.

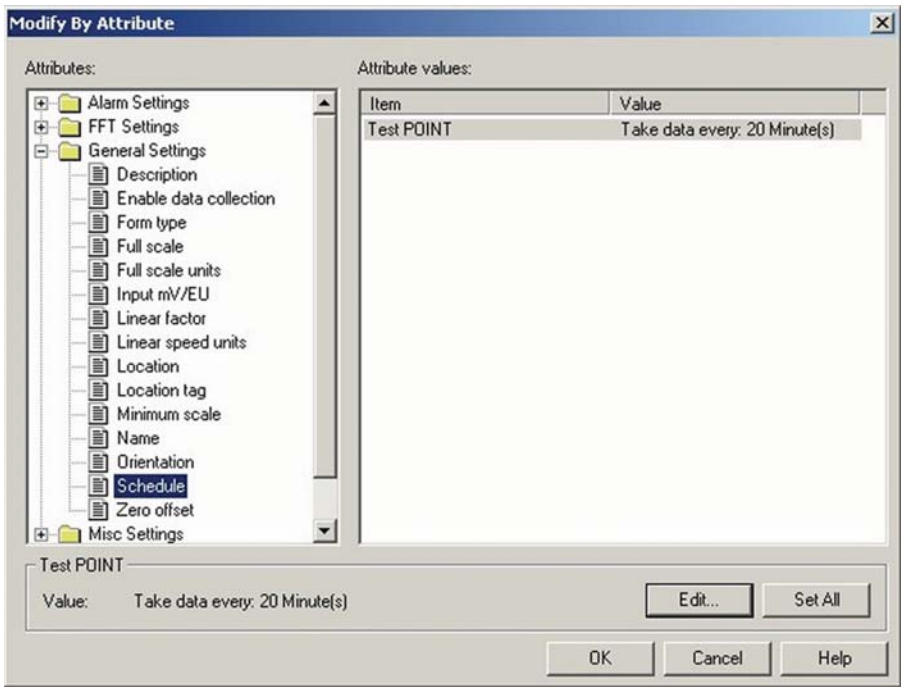

Figure 5. Modify by Attribute dialog.

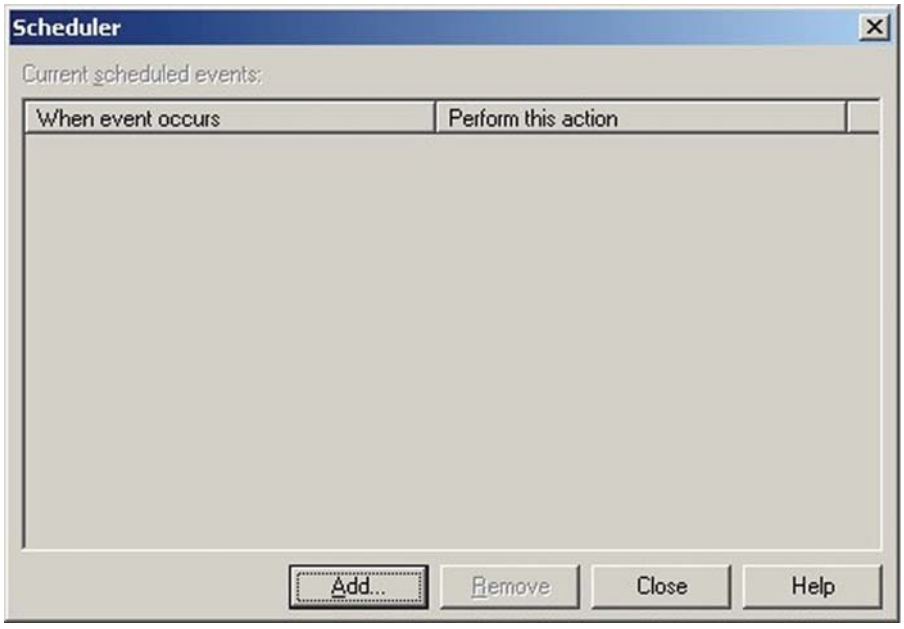

Figure 6. Scheduler Wizard start page.

Event Scheduler wizard

To complete the archiving of data for POINTs, the archiving process must be scheduled for execution. This will determine when, or under what conditions, the archiving should be initiated. This scheduling is completed using Machine Analyst's "Scheduler" function.

The Scheduler wizard can be started from Machine Analyst's main menu; select **Customize/Scheduler** to display the Scheduler wizard dialog, as shown in **fig. 6**.

Existing scheduled events list in the left column. We will example how to initiate the data archival process whenever a "Microlog Upload Complete" event occurs. Select the **Add** button to display the following dialog (→ **fig. 7**).

The next step is to select the type of system event that will cause the action to be performed. Click the **Next** button to display the following dialog (→ **fig. 8**).

We have selected the **Microlog Upload Complete** event. Click the **Next** button to display the following dialog (→ **fig. 9**).

The third item listed is the **Measurement management/archive** action. This action looks at the timestamp and date of the SKF Microlog data that was just uploaded and compares it against the short and long term archiving schedules. If the data does not meet either of these archiving schedules, then the data will not be stored in either the short or long term archive bins. However, the data will still be stored in the current data bin.

Press the **Next** button and you are prompted to finish the event scheduler setup and complete the operation (→ **fig. 10**).

When the scheduled entry is completed, Machine Analyst will automatically perform the archiving process based upon the specified criteria.

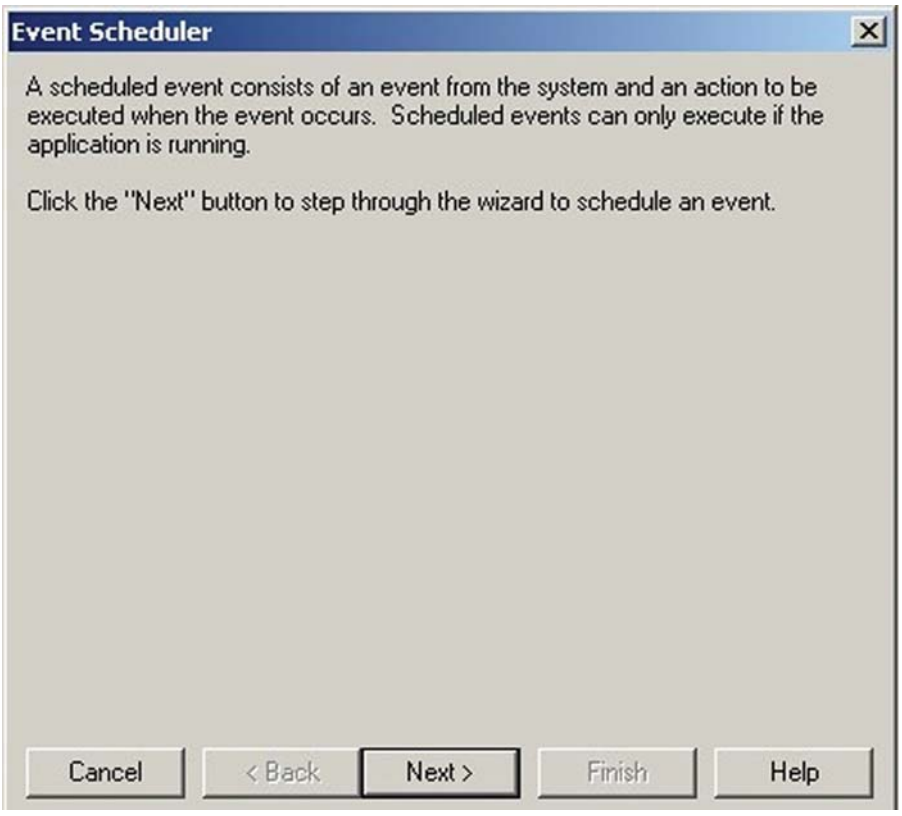

Figure 7. Event Scheduler, second page.

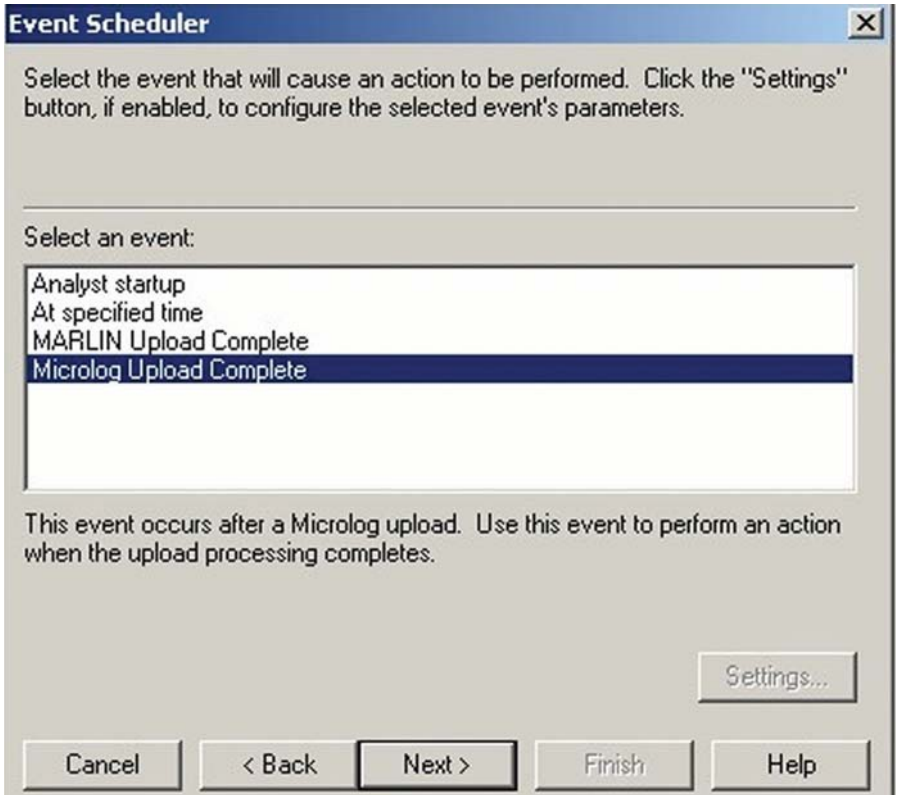

Figure 8. Scheduler/Event Selection dialog.

Manual archiving

Machine Analyst's manual archive feature adds flexibility by allowing the user to specify POINTs to archive and allows you to archive the newest data in addition to the oldest data.

The manual archive process differs from the scheduled archive process in several ways:

- It takes place immediately.
- It archives only those POINTs branching from the selected hierarchy item.
- It only archives measurements from the "current data" bin (unless a specific measurement record from another bin is specified).
- It allows you to specify whether to archive each selected POINT's oldest or newest measurement record from the current data bin.
- It allows you to specify the archive bin in which to place the archived measurements.

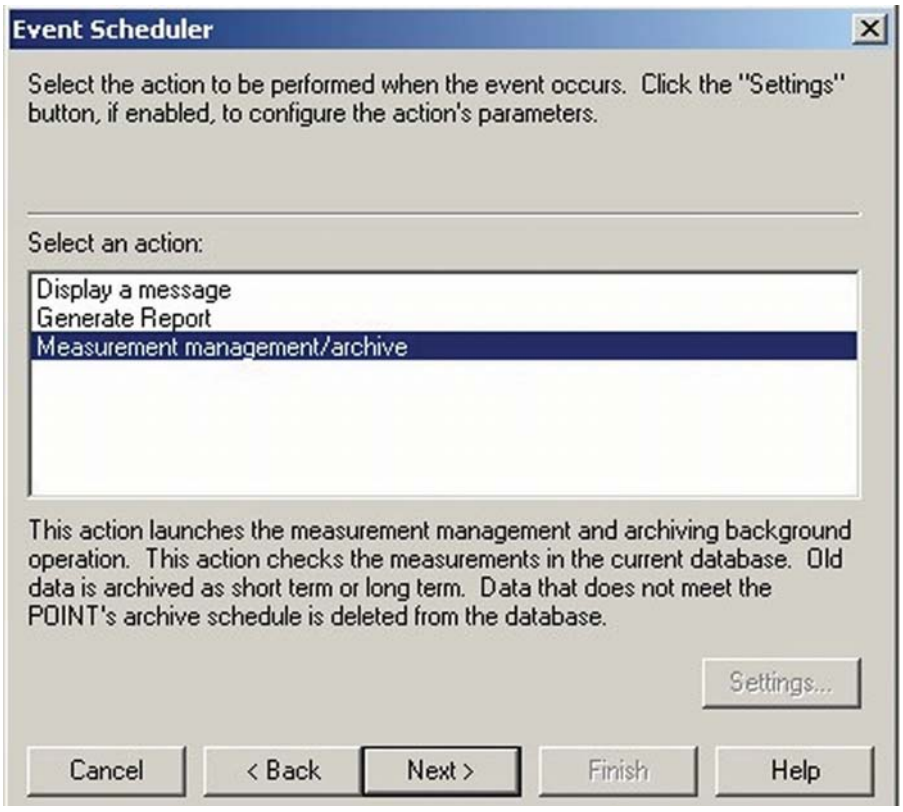

Figure 9. Scheduler/Action Selection dialog.

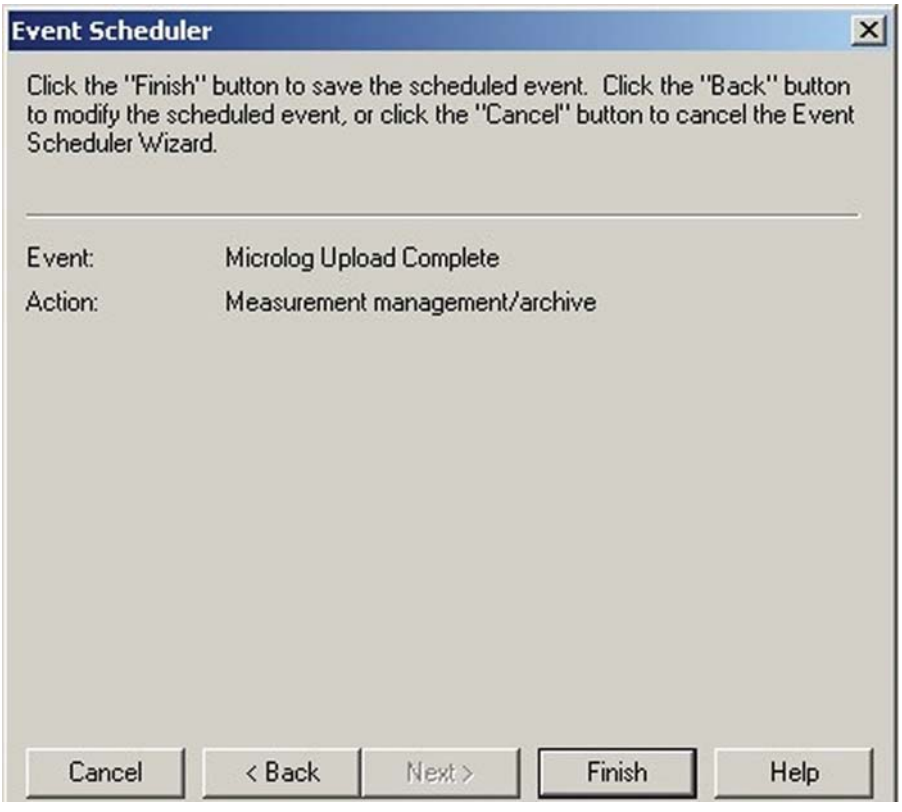

Figure 10. Review/Finish Setup dialog.

Manual archive is also useful to manually set a measurement's archive status, which bypasses the automatic archive schedule, if it is set.

To use manual archive:

- In the hierarchy, select a hierarchy item(s) whose measurements you wish to manually archive. All POINTs branching from the selected item are archived.
- Select the File menu's **Manual Archive** option. The **Manual Archive** dialog displays (→ **fig. 11**).

The dialog's top area displays a warning if the selected data is tagged as baseline. Note that baseline data cannot be modified.

You can change the archive status from within the **Store measurements as** area. Select from:

- Current data bin (available only when archiving a measurement record from other bins)
- Unscheduled data bin
- Short term archive data bin
- Long term archive data bin

In the **Archive measurements** area, if working from a POINT or above on the hierarchy branch, select either:

- **Oldest** – Archive each selected POINT's oldest measurement in the current data bin.
- **Newest** – Archive each selected POINT's newest measurement in the current data bin.

Manual archive does not utilize "scheduled" archive settings, and by default, archived data does not display in the hierarchy list. To display archived data, adjust Machine Analyst's measurement display preferences using the Customize menu's **Preferences/Measurement** tab. You may also enable the **Preferences/General** tab's **Display Measurement** status in detail list option to display "current", "unscheduled", "short term", "long term" or "baseline" after the measurement name when viewing a measurement in the right window panel (with the details icon view selected).

Figure 11. Manual Archive dialog.

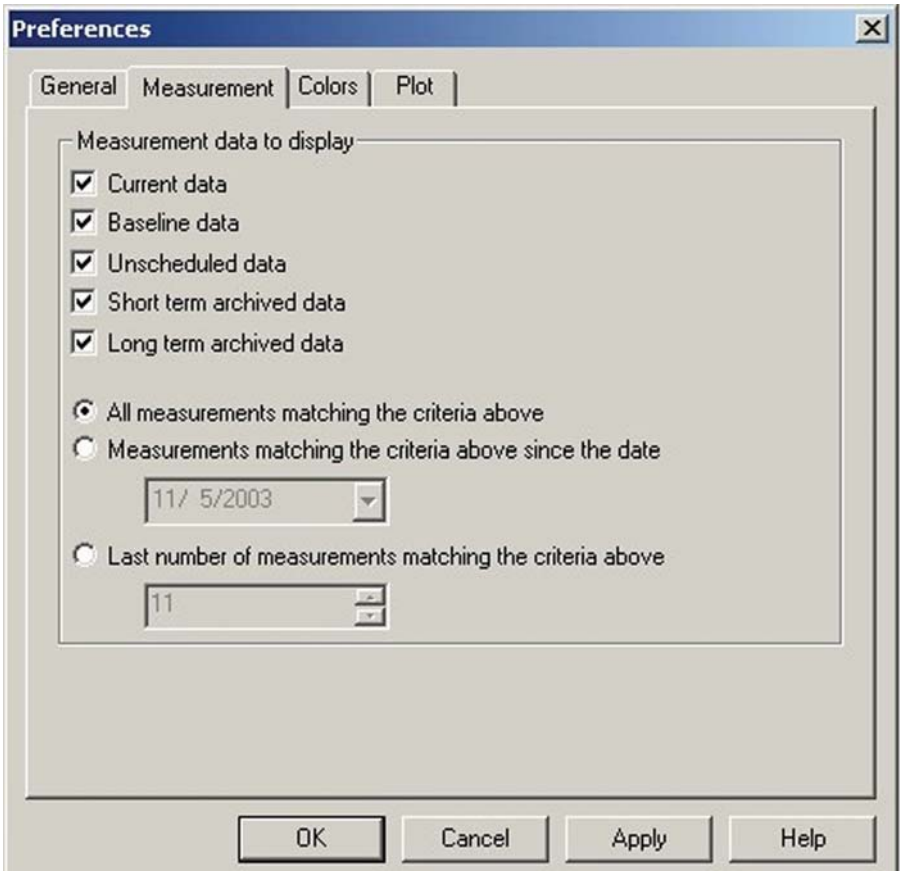

Figure 12. Enable viewing of archived measurements.

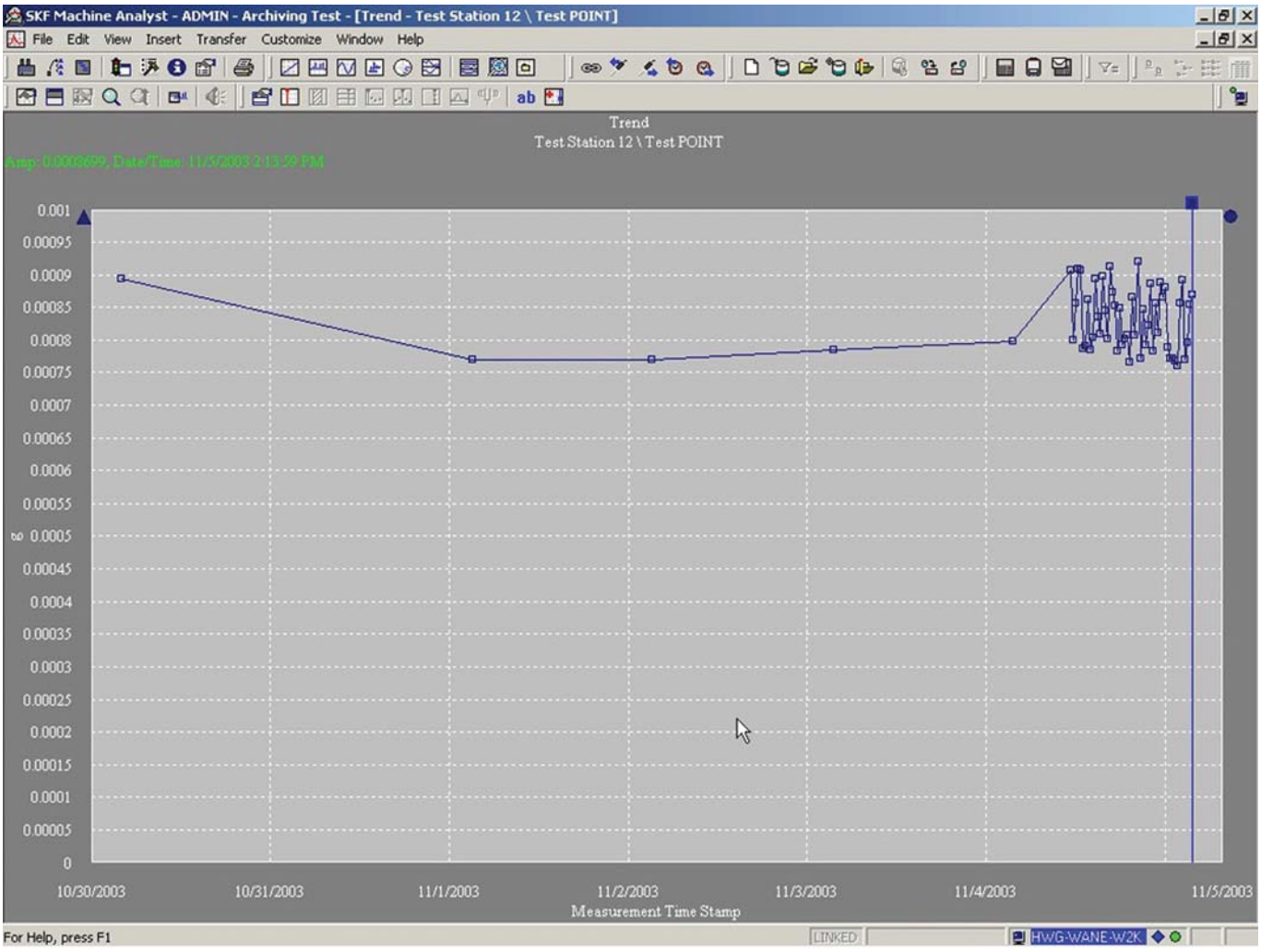

Figure 13. Example trend showing short term archive and current data.

Viewing archived data

To view archived data, both short term and long term measurement viewing must be enabled (→ **fig. 12**). By default (after initial installation), Machine Analyst only enables current, baseline and unscheduled measurements for viewing. To enable viewing of short and long term archive measurements, select **Customize/Preferences** from the main menu, then select the **Measurement** tab and enable the checkboxes for short term and long term archived data.

Fig. 13 shows an overall trend, with short term archived measurement points on the left and current measurement points (the cluttered points) on the right.

The plot is further simplified by viewing only the short term data, as shown in **fig. 14**.

Conclusion

Machine Analyst provides the user with improved data collection and archival tools over previous software versions. Using the short and long term archiving functions can reduce data clutter and reduce the amount of time and space required to back up this data. On-line data that is in alarm is automatically archived in the “Unscheduled data” bin.

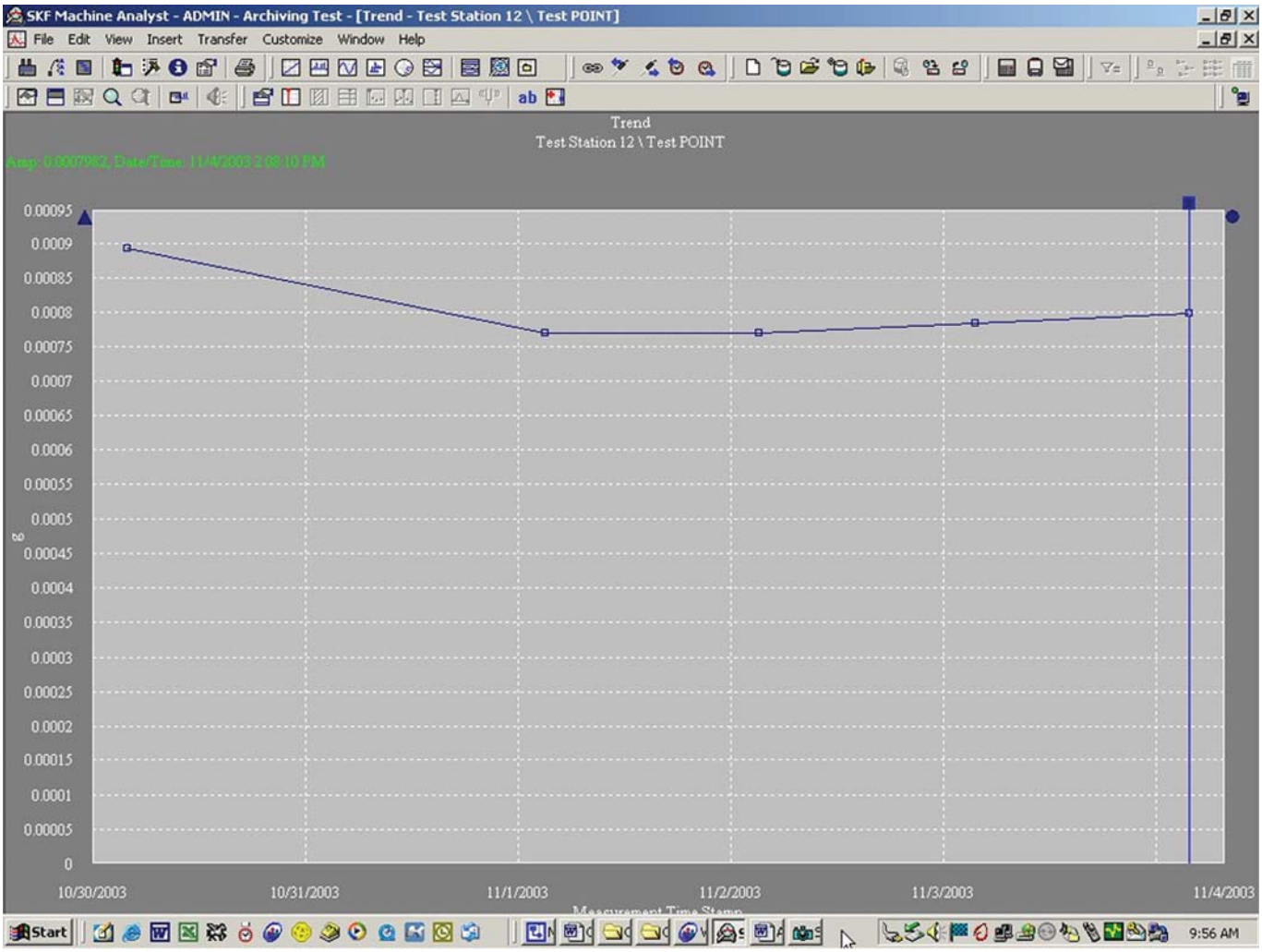

Figure 14. Sample trend showing only short term archive data.

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