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Oscilloscope Manual

ver.1 rev. 11/'07

Enclosure to Service Manual of:

- **Magnum400™**
- **McbNET Digital™**
- **MiniMagnum400™**
- **Fast Back™**

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Release	Notes
ver.1 rev.11/'07	Preliminary first edition.

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THIS MANUAL IS EXCLUSIVELY ADDRESSED TO TECHNICAL PERSONNEL WITH AN APPROPRIATE TECHNICAL KNOWLEDGE ON SERVODRIVE. BEFORE USING THIS MANUAL READ DRIVE'S SERVICE MANUAL AND ENCLOSURE "SPEEDER ONE INTERFACE".

1 Oscilloscope

With drives **Magnum400™**, **McbNET Digital™**, **Fast Back™** and **MiniMagnum™** it is possible to use the digital oscilloscope implemented into the Axor *Speeder One* interface.

The oscilloscope functions as a normal two channel digital oscilloscope and it allows visualizing: *motor speed, phase current, position error*, etc.

To open the **Oscilloscope** window (see *Fig.1*) click on the **oscilloscope icon** in the main window of the *Speeder One* interface:

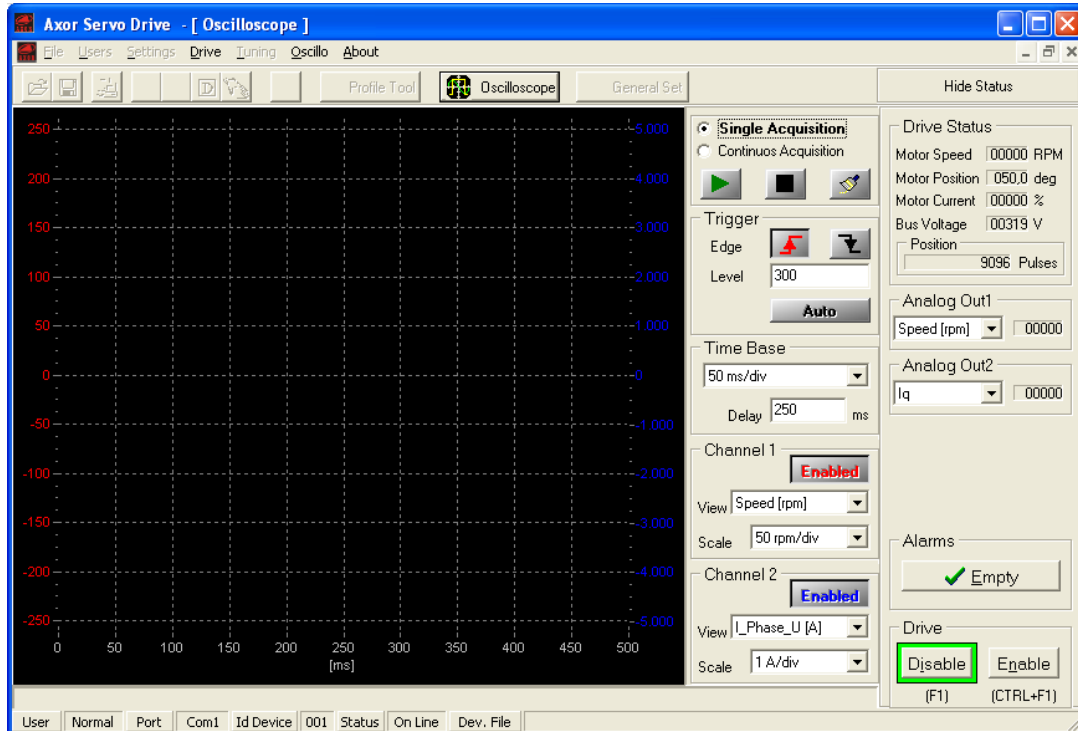


Fig. 1: Oscilloscope window

2 Oscilloscope - Parameter setting

DATA ACQUISITION:



Fig. 2: Data acquisition settings

Single Acquisition

Selecting the *Single Acquisition* option, the oscilloscope's behaviour is dependant upon enablement/disablement of a trigger event:

CASE 1: If the trigger event is enabled on rising edge or falling one of signal in Channel 1, the oscilloscope waits for the first trigger event. At trigger arrival the trace is visualized and data acquisition is stopped. To capture a new trigger event it is necessary to start a new acquisition by clicking on the icon ►.

CASE 2: If trigger event is disabled, the oscilloscope acquires new data, it visualizes it, then it stops. To upgrade the trace it is necessary to start a new acquisition by clicking on the icon ►.

Continuous Acquisition

Selecting the *Continuous Acquisition* option, the oscilloscope's behaviour depends upon enablement/disablement of trigger event:

CASE 1: If trigger event is enabled on the rising or falling edge of a signal in Channel 1, oscilloscope waits until the first trigger event. At trigger's arrival the trace is visualized and it is updated at each trigger event.

CASE 2: If trigger is disabled, oscilloscope continually acquires new data and updates traces.

START/STOP/RESET DATA ACQUISITION:



It starts data acquisition in both modes *Single* or *Continuous Acquisition*.

It stops data acquisition in Continuous Acquisition mode, or in Single Acquisition mode if there is not a trigger event.

It resets the window eliminating the visualized traces.

2 Oscilloscope - Parameters setting

TRIGGER EVENT:

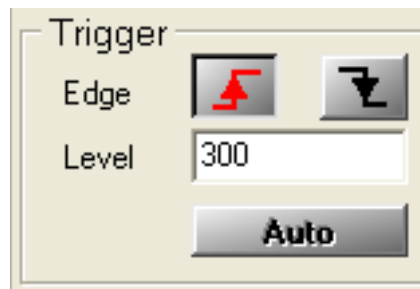


Fig. 3: Trigger event setting

Enabling trigger event it is possible to acquire and visualize the traces only at the occurrence of a definite signal in Channel 1; that signal is characterized by a rising edge or a falling one and by a level (or amplitude). To enable a trigger event it is necessary:

- 1st to set the rising or falling edge (**Edge** icons);
- 2d to set the desired level (**Level** parameter).

Clicking the **Auto** button it is possible to disable the trigger event \Rightarrow the oscilloscope will continue to acquire new data and update the traces.

You should use the **Auto** trigger function:

- during first acquisition, in order to know the scale of input signals;
- in presence of low repetitive signal rates;
- in presence of dc signals.

TIME BASE:

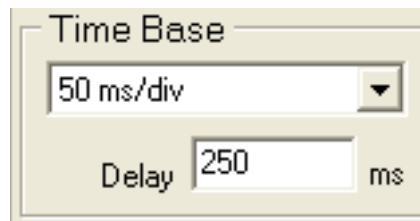


Fig. 4: Time base setting

Time Base

This allows you to change the scale of the horizontal axis, the time base. The min. resolution is 1ms/div, while the max is 1s/div.

Delay

If the trigger event is enabled the value set in **Delay** fixes the point, in the horizontal axis, where the trigger event will be visualized; on the contrary, if the trigger event is disabled the value set in Delay is ignored.

The default value set for the Delay parameter is in the middle window.

2 Oscilloscope - Parameter settings

SIGNAL SETTING:

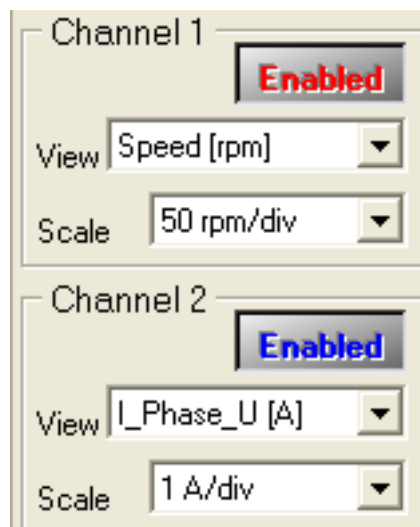


Fig. 5: Input signal setting

Channel 1 (View) and Channel 2 (View)

This allows you to select the signal to visualize. The different options are as follows:

- the motor speed: **Speed [rpm]**
- the phase U current: **I_Phase_U [A]**
- the position error: **Posit_Err [Pulses]** (not yet enabled)
- the quadrature current: **Iq[A]**

The Channel 1 is enabled if the reference button **Enabled** is red, while Channel 2 is enabled if the reference button **Enabled** is blue.

To disable a channel click on the Enabled button \Rightarrow **Disabled** appears.

Channel 1 (Scale) and Channel 2 (Scale)

The unit of vertical scale is automatically set by choosing an input signal:

- **rpm/div** for speed
- **mA/div** or **A/div** for current
- **Pulses/div** for position error

However, it is possible to change the scale selecting from values in the **Scale** menu.

For Channel 1 the scale will be visualized in red on the left, while for Channel 2 the scale will be visualized in blue on the right.

3 Example: speed and current view

Suppose we want to visualize by digital oscilloscope **motor speed** and **phase current**.
In the following example we used a **Magnum400™** coupled with an Axor motor (without load).

The procedure is described below:

- 1- Follow the *basic procedure* illustrated in the Service Manual of the drive.
- 2- Open the *Speeder One* interface and connect to the drive.
- 3- Select, for example, the operative mode "**Square Wave**", then set a *speed reference* equal to 1000rpm and a *square wave period* equal to 2000ms.
- 4- Open the **Oscilloscope** window by clicking on oscilloscope icon.
- 5- In the Oscilloscope window set the *initial parameters* (see Fig.6):
 - a) Select **Continuous Acquisition**.
 - b) Trigger \Rightarrow click on **Auto** button.
 - c) Time base \Rightarrow set to 200ms/div.
 - d) Channel 1: View \Rightarrow select Speed[rpm].
Scale \Rightarrow select 500rpm/div.
 - e) Channel 2: View \Rightarrow select I_Phase U[A].
Scale \Rightarrow select 2A/div.

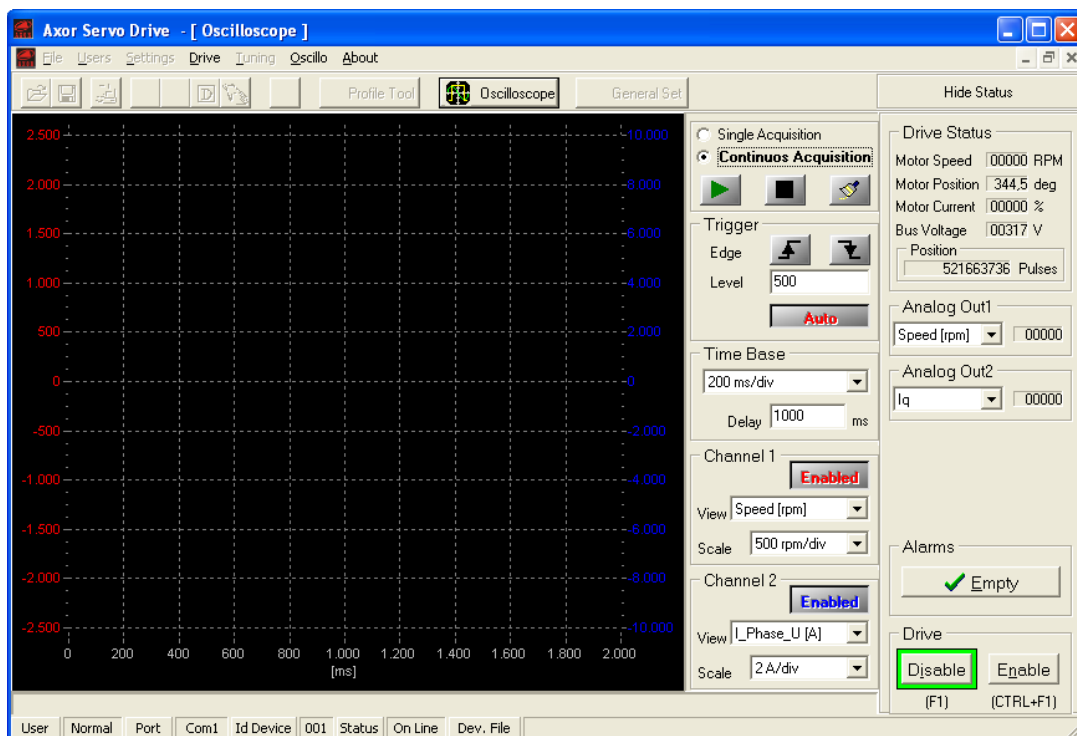


Fig. 6: Parameter settings in the Oscilloscope window

3 Example: speed and current view

6- Enable the drive by clicking the **Enable** icon.

7- Start data acquisition by clicking the icon ►. Wait a few seconds in order to acquire traces (see Fig. 7):

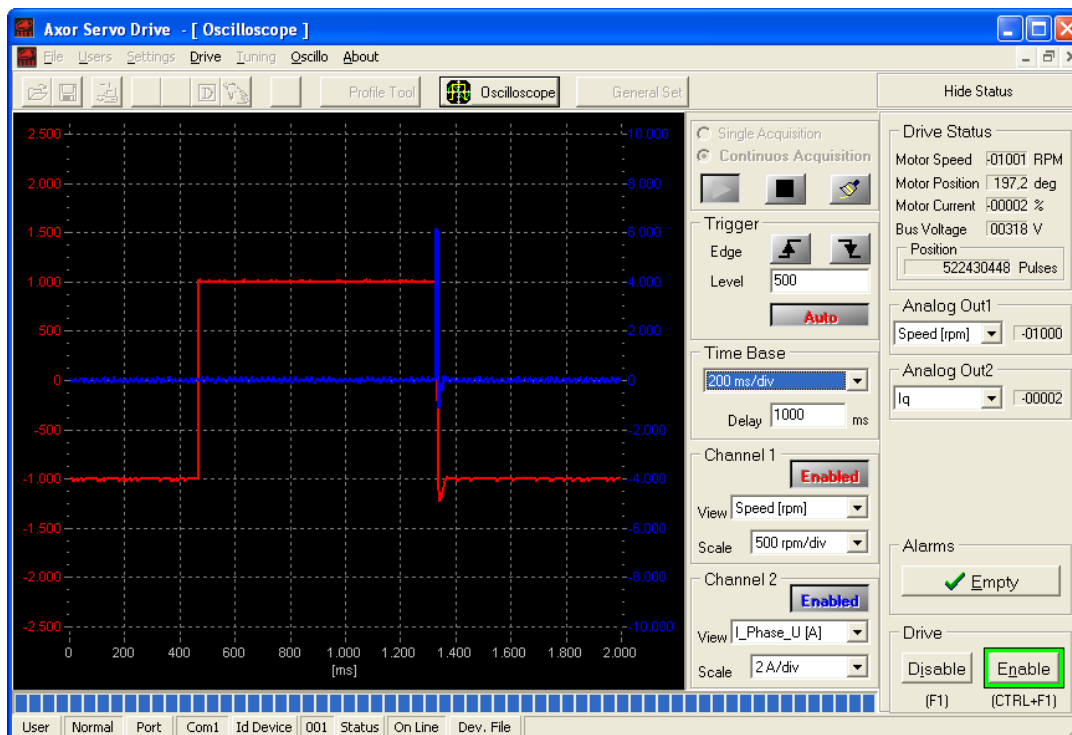


Fig. 7: Traces visualized using initial parameters

8- Parameters corrections:

a) If necessary, *adjust the vertical scale* of speed and current:

- If the trace overflows the window ⇒ increase the scale.
- If the trace is too pressed ⇒ decrease the scale.

In the trace visualized in Fig.7, it is not necessary to change the speed scale nor the current scale.

b) Set the *Trigger* on the rising edge (or falling edge) of the signal in Channel 1, choosing a trigger level based upon the signal to be visualized. Setting a level that is too high will result in no data acquisition.

Having traces visualized in Fig.7, it is convenient to set the trigger on the rising edge and with a level equal to 500 (in the range between -1000 and +1000); in fact setting a level too high (>1000 or <-1000) should result in no valid trigger event.

c) If necessary, *adjust the horizontal scale*, *Time Base* parameter:

- To visualize more periods of input signals ⇒ increase Time Base parameter.
- To visualize less periods of input signals ⇒ decrease Time Base parameter.

With traces visualized in Fig.7, it is not necessary to change the time base.

3 Example: speed and current view

d) To avoid the continuous trace refresh and to visualize the signal on the first valid trigger event:

1. click on icon ■.
2. select **Single Acquisition**.
3. click on icon ►.
4. at each new desired acquisition click on icon ►.

Doing the adjustments described above, we acquired the traces illustrated in Fig.8:

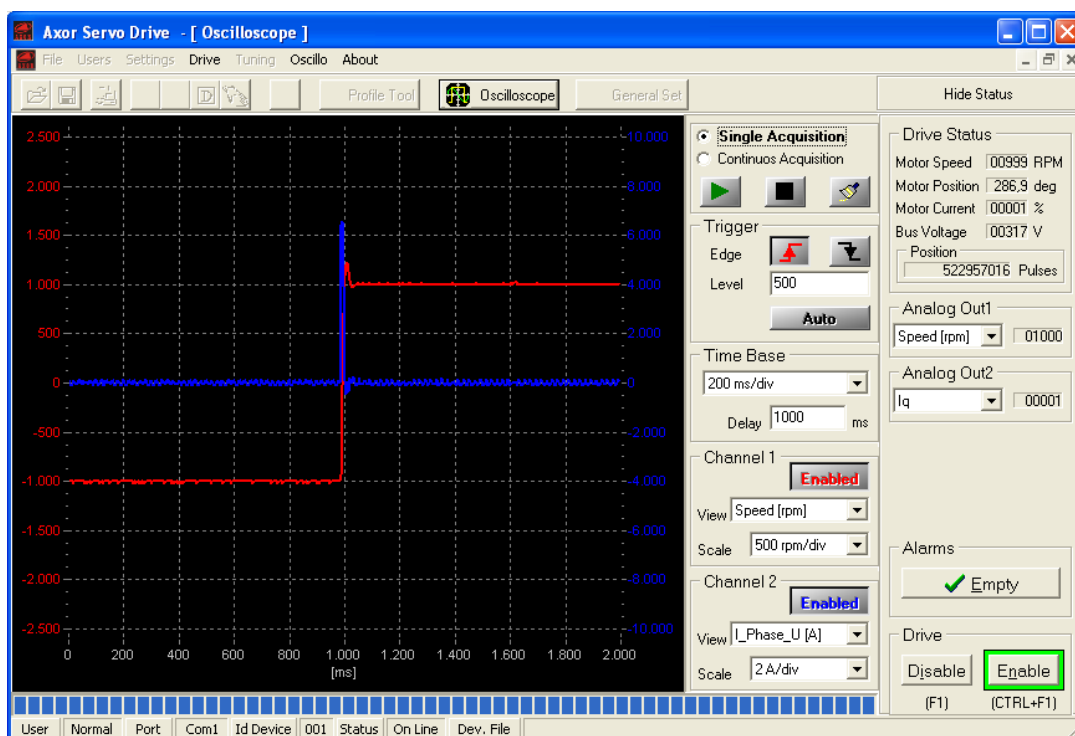


Fig. 8: Traces visualized after parameter adjustment

Since



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