
Engineer's Guide

SMART TRACTM
DM6420 Multi I/O Card

MagneTek, Inc. - Drives & Systems Division

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Important Safety and Warranty Information

Warnings, Cautions and Notes



WARNING

A statement of conditions which **MUST BE OBSERVED** to prevent personal injury or death.



WARNING - ESD

A statement of conditions which must be observed to prevent damage to components due to ESD (ElectroStatic Discharge) and to prevent personal injury or death.



CAUTION

A statement of conditions which must be observed to prevent undesired equipment faults, Smart Trac AC1 system degradation and damage to equipment.

IMPORTANT

A statement of conditions which should be observed during Smart Trac AC DeviceNet setup or operation to ensure dependable service.

NOTE: Notes indicate information that is in addition to a discussion of the topic in adjoining text. Alternatively, it may limit or restrict the paragraph(s) that follow(s) to specific models or conditions.

TIP - Tips indicate information that should make a procedure easier or more efficient.

General Safety Precautions - Warnings

Important safety information follows. Please *read and understand* all precautions listed below before proceeding with the specification, installation, set-up or operation of your Smart Trac AC1. Failure to follow any of the following precautions may result in personal injury or death, or damage to the equipment.



WARNING - ESD

The Control Printed Circuit Board (PCB) employs CMOS Integrated Circuits that are easily damaged by static electricity. Use proper ElectroStatic Discharge (ESD) procedures when handling the Control PCB. See Smart Trac AC1 Technical Manual for details. Failure to comply may result in damage to equipment and/or personal injury.

Important Warranty Information.

Do not modify your Smart Trac AC1, its components, or any of the procedures contained in the technical documentation supplied by MagneTek. Any modification of this product by the user is not the responsibility of MagneTek and will void the warranty.

DM6420 Multi I/O Driver Installation

Installing the Smart Trac DM6420 Multi I/O Driver

1. Click **START, PROGRAMS, MAG-300, CONTROL MANAGER**. The Control Manager software loads.
2. Expand the **Project** folder tree and right click the **Drivers** folder. A selection box appears with **New...** highlighted.

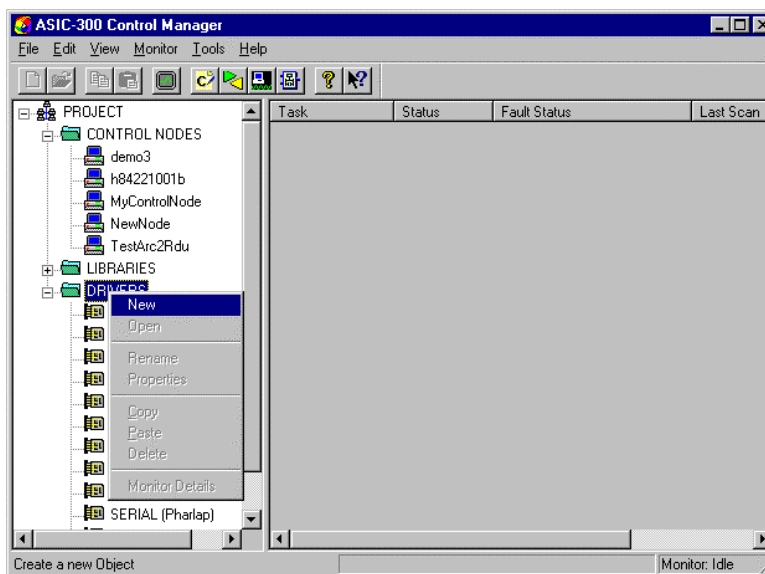


Figure 1. The New Device Driver Selection box.

3. Click the New selection box. The **Install Driver** dialog box appears.

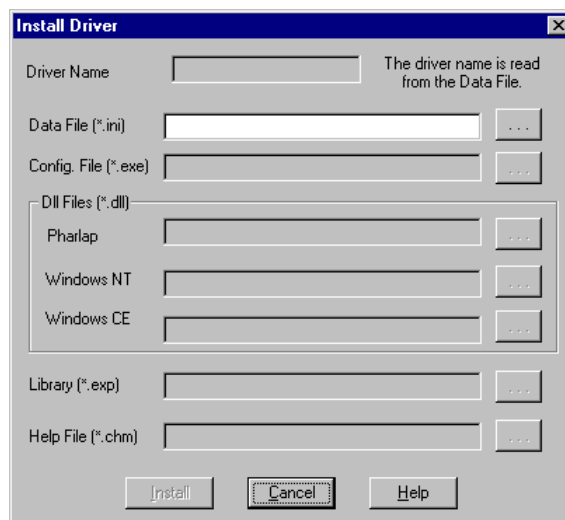


Figure 2. I/O Driver Install dialog box.

*To view driver .dll files, you must select View All Files in Windows NT Explorer. If you have Windows NT without IE4.0 installed: from Explorer, click **View, Options**, click **View** tab. In **Hidden Files**, click Show all files. If you have IE4.0 installed: from Explorer, click **View, Folder Options**, click the **View** tab. In **Advanced Settings**, click **Show All Files** in the **Hidden files** folder.*

4. Click the small box containing three dots (...) to the far right of the **Data File (*.ini)** box. This allows you to browse for the initialization file on your system (generally the driver will be installed from your CD_ROM). For our example, we assume the file is on a floppy in the A: drive. Find the file **DM6420.ini** and **OPEN** it. Two more boxes, for entry of **Config.exe** and **Help.exe**, become active.
5. Click the small box containing three dots (...) to the far right of the **Config (*.exe)** box. Browse for the **DM6420CFG.EXE** file. Press **TAB** or **ENTER**. More boxes will become active.
6. Click the small box containing three dots (...) to the far right of the **Dll files (*.dll), Pharlap** box. Browse for the **DM6420.dll** file. Press **TAB** or **ENTER**.
7. Click the small box containing three dots (...) to the far right of the **Help (*.chm)** box. Browse for the **STDM6420EM.CHM** file. Press **TAB** or **ENTER**. The screen should look like the following (if installing from the A:\ drive).

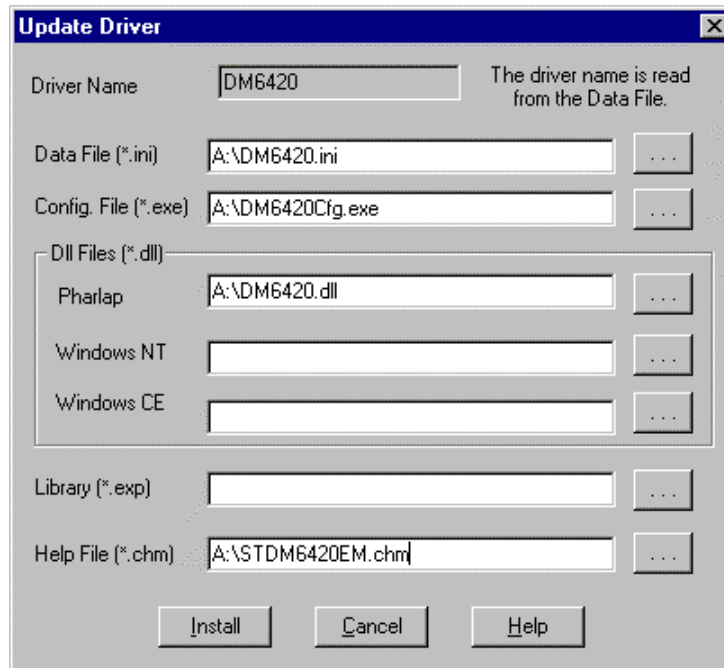


Figure 3 The completed example DM6420 Multi I/O Driver Install screen

8. Click **INSTALL**. When finished, you are returned to Control Manager. The driver name should appear in its own folder within the **Drivers** folder.
9. The DM6420 card library is ready for use.

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DM6420 Capabilities

DM6420 Ports and Tags

The DM6420 interface card provides the following port input/outputs:

Digital

Two digital ports. Digital Port 0 provides 8 bits of I/O. Digital Port 1 provides 1 byte of I/O.

Analog

16 analog input ports and 2 analog output ports.

The DM6420 I/O tags are reflected in the Symbol Manager as follows:

Tag	Description
Port0.InBitn	Digital input bit from Port 0.
Port0.OutBitn	Digital output bit from Port 0.
Port0.InByte	Digital input byte from Port 0.
Port0.OutByte	Digital output byte from Port 0.
Port1.InBitn	Digital input bit from Port 1.
Port1.OutBitn	Digital output bit from Port 1.
Port1.InByte	Digital input byte from Port 1.
Port1.OutByte	Digital output byte from Port 1.
AnaIn1-16	Analog inputs from Port1.
AnaOut1-2	Analog outputs from Port2.

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Software Configuration

The Configuration Procedure

To use the Analog and Digital I/O on your Smart Trac DM6420 Multi I/O card, you must configure the card's Smart Trac Driver in Smart Trac Workstation software. You use symbols, created when the driver is installed, to use these I/O points in function blocks or another IEC 61136-3-compliant programming language.

To configure the card:

1. Click **Start, Programs, MAG-300, Control Studio**. Smart Trac Control Studio loads.
2. A selection box appears listing all established nodes. Click the node for which you wish to configure the Smart Trac DM6420 Multi I/O card.
3. Click the **Interface Cards** folder to highlight it.
4. Scroll using the up and down arrows to find **DM6420**. Double click it. The **Edit Interface Card** screen appears.

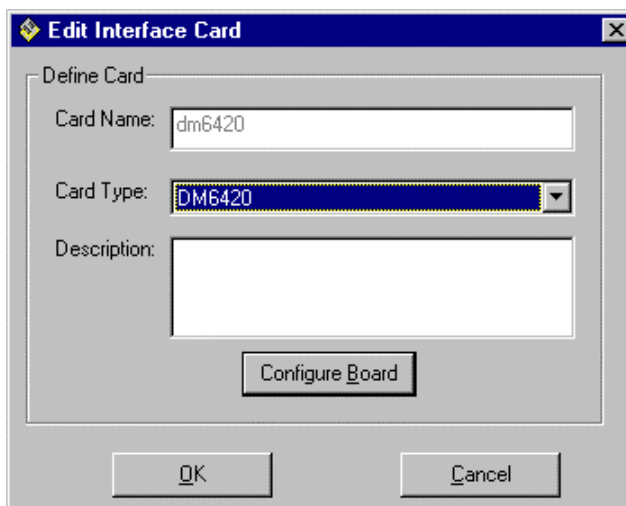


Figure 4. The Edit Interface screen.

5. Click **Configure Board**. The **DM6420 Configuration** screen appears.

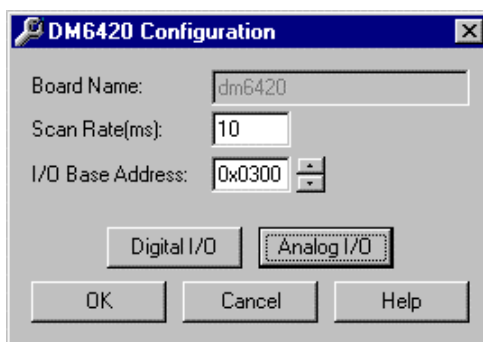


Figure 5. The DM6420 Configuration screen.

6. Enter the Input/Output **Scan Rate** in milliseconds.
7. Enter the **I/O Base Address** as 0x0300, unless you have selected a non-default value (see the Smart Trac DM6420 Multi I/O Card Technical Manual).
8. Click **Digital I/O**. The Digital I/O Configuration screen appears.

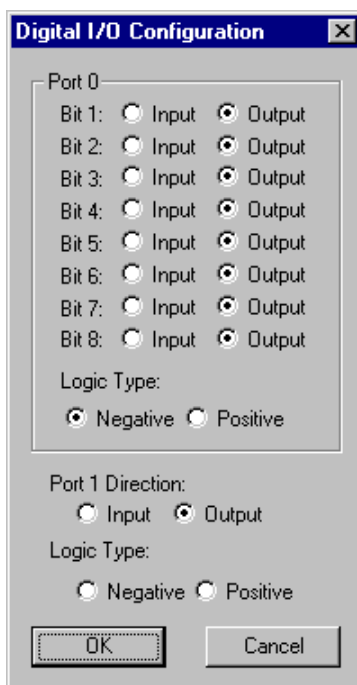
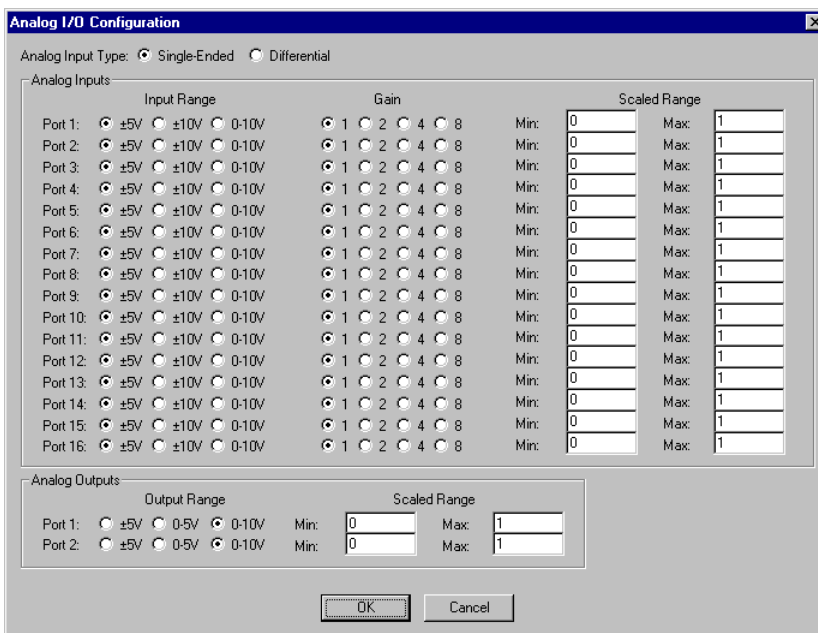


Figure 6. The DM6420 Digital I/O Configuration screen.

9. Using Port 0, you may select directions (Input or Output) for individual bits. Using Port 1, you may select direction (Input or Output) only for entire bytes. Make selections by clicking the associated radio buttons according to the following information:
 - For Port 0, configure **Bit 1** through **Bit 8** as either an input or an output.
 - Select a **Logic Type**, either Negative or Positive. Negative means that a high voltage condition reads as a Boolean FALSE. Positive

logic means that a high voltage condition reads as a Boolean TRUE.

- Select **Port 1 Direction** as input or output. For Port 1, the entire byte must be configured as input or output.
 - Select a **Logic Type** for Port 1, either Positive or Negative. As above, Negative means that a high voltage condition reads as a Boolean FALSE. Positive logic means that a high voltage condition reads as a Boolean TRUE.
- When done making selections, click **CANCEL** to back out of the selections without saving them or click **OK** to save your selections. You are returned to the **DM6420 Configuration** screen.
 - Click **Analog I/O**. The **Analog I/O Configuration** screen appears with **Single-Ended Analog Input Type** selected.



The **Analog I/O Configuration** dialog box has a title bar with a close button. It contains two main sections: **Analog Inputs** and **Analog Outputs**.

Analog Input Type: ☒ Single-Ended ☐ Differential

Analog Inputs:

Port	Input Range	Gain	Min	Max
Port 1:	<input checked="" type="radio"/> ±5V <input type="radio"/> ±10V <input type="radio"/> 0-10V	<input checked="" type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 4 <input type="radio"/> 8	0	1
Port 2:	<input checked="" type="radio"/> ±5V <input type="radio"/> ±10V <input type="radio"/> 0-10V	<input checked="" type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 4 <input type="radio"/> 8	0	1
Port 3:	<input checked="" type="radio"/> ±5V <input type="radio"/> ±10V <input type="radio"/> 0-10V	<input checked="" type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 4 <input type="radio"/> 8	0	1
Port 4:	<input checked="" type="radio"/> ±5V <input type="radio"/> ±10V <input type="radio"/> 0-10V	<input checked="" type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 4 <input type="radio"/> 8	0	1
Port 5:	<input checked="" type="radio"/> ±5V <input type="radio"/> ±10V <input type="radio"/> 0-10V	<input checked="" type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 4 <input type="radio"/> 8	0	1
Port 6:	<input checked="" type="radio"/> ±5V <input type="radio"/> ±10V <input type="radio"/> 0-10V	<input checked="" type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 4 <input type="radio"/> 8	0	1
Port 7:	<input checked="" type="radio"/> ±5V <input type="radio"/> ±10V <input type="radio"/> 0-10V	<input checked="" type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 4 <input type="radio"/> 8	0	1
Port 8:	<input checked="" type="radio"/> ±5V <input type="radio"/> ±10V <input type="radio"/> 0-10V	<input checked="" type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 4 <input type="radio"/> 8	0	1
Port 9:	<input checked="" type="radio"/> ±5V <input type="radio"/> ±10V <input type="radio"/> 0-10V	<input checked="" type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 4 <input type="radio"/> 8	0	1
Port 10:	<input checked="" type="radio"/> ±5V <input type="radio"/> ±10V <input type="radio"/> 0-10V	<input checked="" type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 4 <input type="radio"/> 8	0	1
Port 11:	<input checked="" type="radio"/> ±5V <input type="radio"/> ±10V <input type="radio"/> 0-10V	<input checked="" type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 4 <input type="radio"/> 8	0	1
Port 12:	<input checked="" type="radio"/> ±5V <input type="radio"/> ±10V <input type="radio"/> 0-10V	<input checked="" type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 4 <input type="radio"/> 8	0	1
Port 13:	<input checked="" type="radio"/> ±5V <input type="radio"/> ±10V <input type="radio"/> 0-10V	<input checked="" type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 4 <input type="radio"/> 8	0	1
Port 14:	<input checked="" type="radio"/> ±5V <input type="radio"/> ±10V <input type="radio"/> 0-10V	<input checked="" type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 4 <input type="radio"/> 8	0	1
Port 15:	<input checked="" type="radio"/> ±5V <input type="radio"/> ±10V <input type="radio"/> 0-10V	<input checked="" type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 4 <input type="radio"/> 8	0	1
Port 16:	<input checked="" type="radio"/> ±5V <input type="radio"/> ±10V <input type="radio"/> 0-10V	<input checked="" type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 4 <input type="radio"/> 8	0	1

Analog Outputs:

Port	Output Range	Min	Max
Port 1:	<input type="radio"/> ±5V <input type="radio"/> 0-5V <input checked="" type="radio"/> 0-10V	0	1
Port 2:	<input type="radio"/> ±5V <input type="radio"/> 0-5V <input checked="" type="radio"/> 0-10V	0	1

At the bottom are **OK** and **Cancel** buttons.

Figure 7. Analog I/O Configuration screen.

- You can configure either **Single-Ended** or **Differential** analog input types. If **Single-Ended** types are selected, all 16 Ports are available. If **Differential** types are selected, 8 Ports are available. Make selections by clicking the associated radio buttons according to the following information:
 - For **Input Range**, select one of three possible ranges for each input signal: $\pm 5V$; $\pm 10V$; or $0V$ to $10V$.
 - For **Gain**, select one of four possible gains for each input signal: a gain of 1, 2, 4 or 8 times.
 - Enter values for the **Scaled Range** of each input. For example, if the input range is set to $\pm 5V$ and the **Scaled Range** is set to **Min** = 0 and **Max** = 1, then the tag will display $-5V$ as 0.0 and $+5V$ as 1.0. Intermediate values will be scaled proportionately through this range.

SMART TRAC DM6420 Multi I/O Card

13. Configure the **Analog Outputs - Output Range** in a similar manner to that described in the previous step for the two analog input ports.
14. When done making selections, click **CANCEL** to back out of the selections without saving them or click **OK** to save your selections. You are returned to the **DM6420 Configuration** screen.

Troubleshooting the DM6420 Multi I/O Card

Glossary of Terms

I/O Base Address	Input/Output Base Address: The first address of a series of memory addresses. It describes the start of I/O space in a network interface card.
IEC 61136-3	Part 3 of the international standard on Programmable Controllers, which specifies Programming Languages, including Relay Ladder Logic (RLL), Structured Text (ST), Sequential Function Charts (SFC), Function Blocks (FB), and Instruction Lists (IL).
Scan Rate	The rate of polling workstations or nodes on a network.

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