Engineer's Guide

SMART TRAC™ *Digital Operator*

MagneTek, Inc. - Drives and Systems Division

Contents

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Operator Driver Installation

Installing the Smart Trac Operator 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.
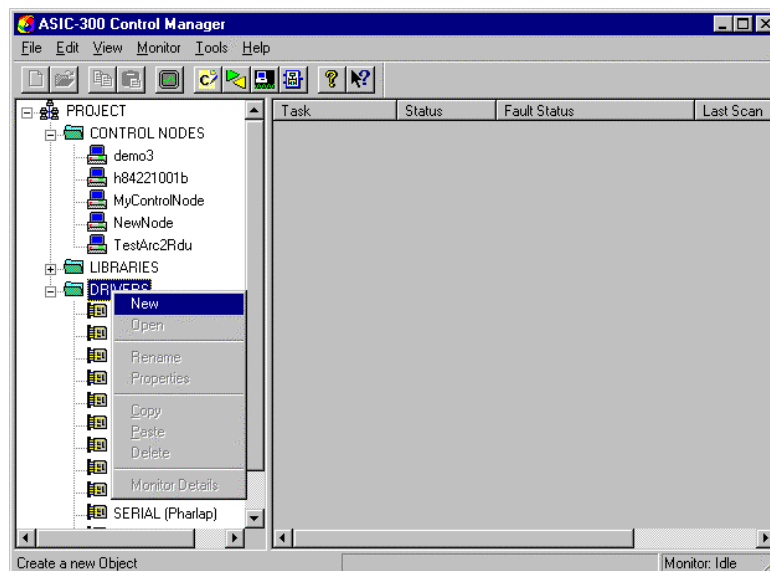
Figure 1. The New Device Driver Selection box.

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

Figure 2. I/O Driver Install dialog box.

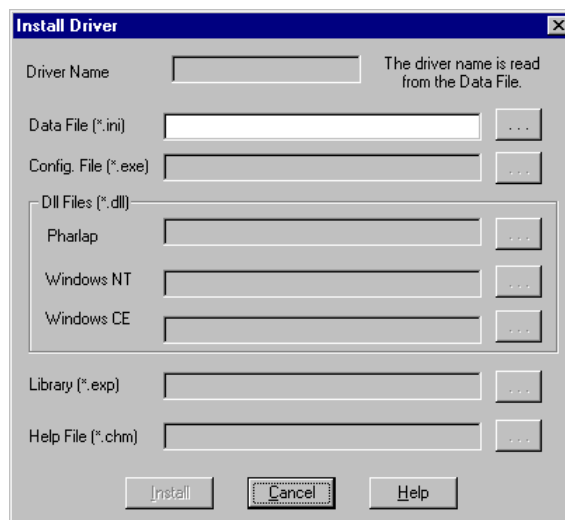*To view driver .dll files, you must select View All Files in Windows NT Explorer. If you have Windows NT without IE4.0 installed: from Explorer, click **View**, **Options**, click **View** tab. In **Hidden Files**, click Show all files If you have IE4.0 installed: from Explorer, click **View**, **Folder Options**, click the **View** tab. In **Advanced Settings**, click **Show All File**s 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 **Operator.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 **Operator.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 **Help (*.chm)** box. Browse for the **STOperatorEM.CHM** file. Press **TAB** or **ENTER.** The screen should look like the following (if installing from the A:\ drive).
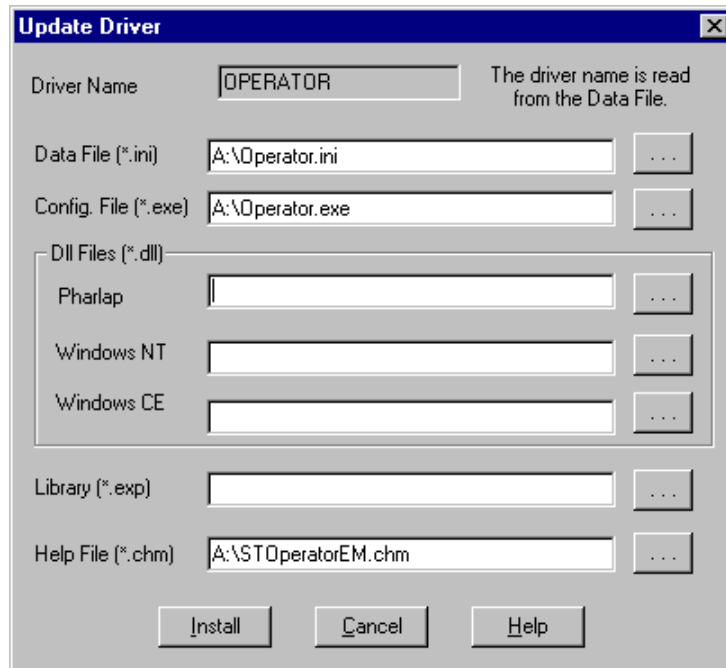
Figure 3 *The completed example Operator Driver Install screen*

7. Click **INSTALL**. When finished, you are returned to Control Manager. The driver name should appear in its own folder within the **Drivers** folder.

8. The Operator card library is ready for use.
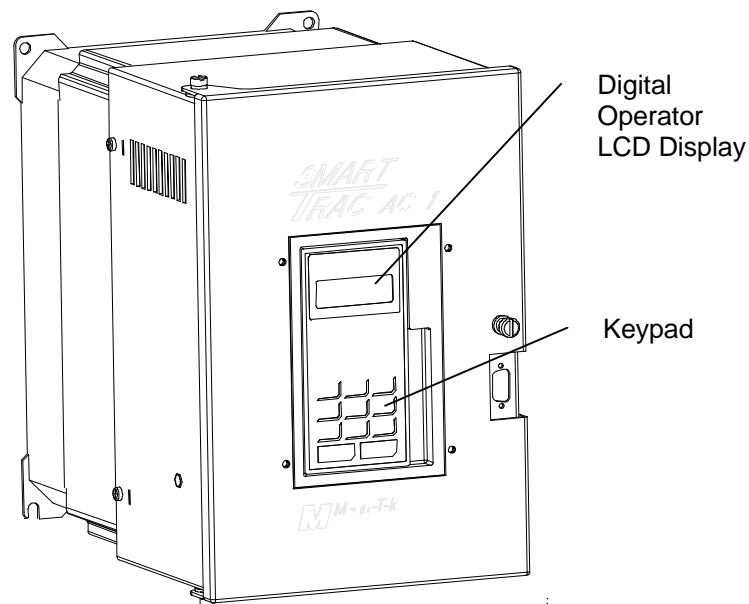
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The Smart Trac AC1 Digital Operator

Identifying Controls and Indicators

The face of the Smart Trac AC1 contains an eleven-key keypad for data input, a two-line by sixteen-character LCD display and LED's to provide status information.

Digital
Operator
LCD Display

Keypad

Figure 4. Typical Smart Trac AC1 with keypad and LCD display.

An **RS-232 port**, also located on the face of the Smart Trac AC1, provides one means to connect a personal computer to the unit (optional communications cards providing other means).

Controls

Two types of controls exist on the Smart Trac AC1: **DATA** and **CONTROL**.

- The **DATA** group includes keys labeled **MENU**, **UP**, **DOWN**, **RIGHT**, **ESCAPE** and **DATA/ENTER**. These keys allow setting or viewing of

data including parameters, feedbacks and selection and use of special functions.
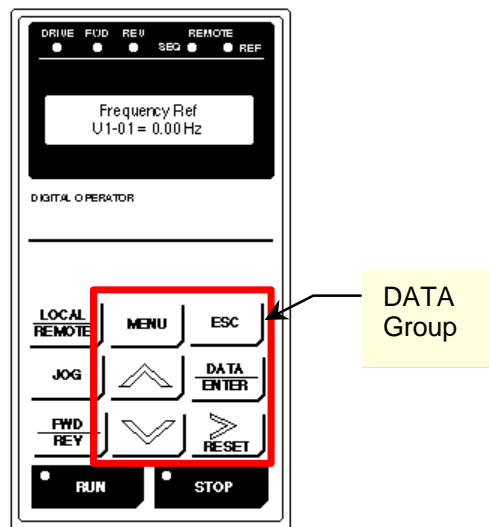
Figure 5. The DATA group of the Smart Trac AC1 Digital Opertor.

- The **CONTROL** group includes the keys labeled **LOCAL/REMOTE**, **JOG**, **FWD/REV**, **RUN** and **STOP**. These keys provide control over the operation of the Smart Trac AC1. Although labeled for "typical" use, they may be programmed to operate differently. Consult the documentation specific to your Smart Trac AC1.
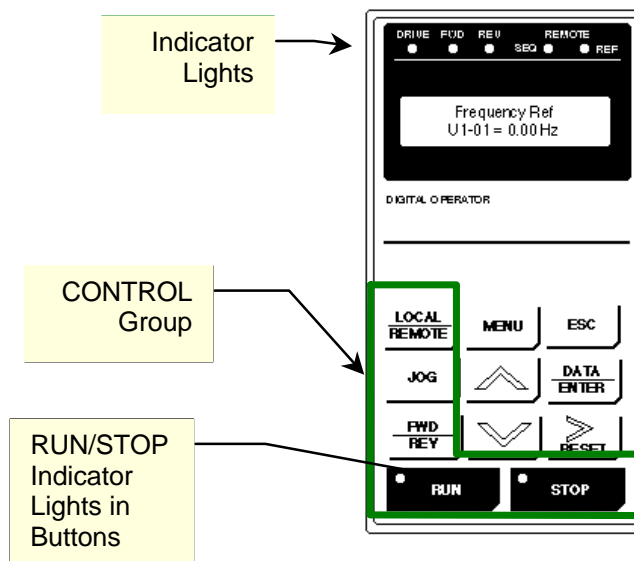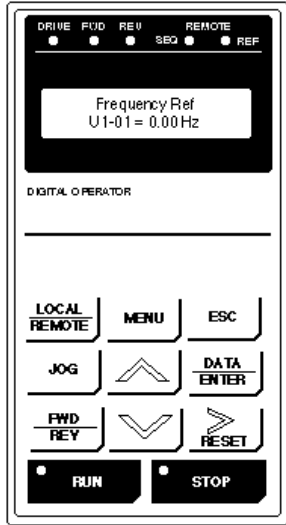
Figure 6. The CONTROL Group and Indicators of the Smart Trac AC1 Digital Operator.

Indicators

Indicators include seven status lights labeled **DRIVE**, **FWD**, **REV**, **REMOTE/SEQ** and **REMOTE/REF**, **RUN** and **STOP**, and the LCD display showing status, fault or parameter information. What causes these lights to be
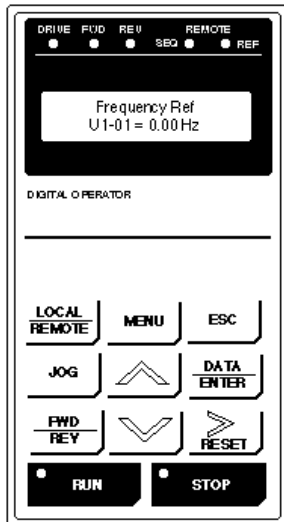
triggered on or off is entirely up to the application program. The behavior of each of these controls and indicators is described in several tables that follow.

Table 1. Digital Operator Indicators

Digital Operator Indicators	
Indicator Lamp	**Function**
DRIVE	Red light - *programmable*. Typically lights (ON) when Smart Trac AC1 is in Drive mode of operation.
FWD	Red light – *programmable*. Typically lights (ON) when FWD motor direction is selected.
REV	Red light – *programmable*. Typically lights (ON) when REV motor direction is selected.
REMOTE/ SEQ	Red light – *programmable*. Typically ON when Smart Trac AC1 is operating from external RUN and STOP signals.
REMOTE/ REF	Red light – *programmable*. Typically ON when Smart Trac AC1 operating by an external frequency reference signal.
RUN	Red light – *programmable*. Typically OFF when Smart Trac AC1 is in stopped condition. Typically lights steadily (ON) when Run signal is active. It blinks after Stop signal has been received and Smart Trac AC1 is ramping down.
STOP	Red light – *programmable*. Typically, lights steadily (ON) at initial power-up. Typically blinks after Run signal becomes active but frequency reference is zero. Typically off when Smart Trac AC1 is controlling motor speed.

Table 2. Digital Operator Control Keys

| Digital Operator Control Keys	
Key Label	**Function**
LOCAL/ REMOTE LOCAL/REMOTE	*Programmable.* Typically programmed to toggle between the Digital Operator and Remote (terminal) modes of operation. Active only when Smart Trac AC1 is in stopped condition.
JOG JOG	*Programmable.* Typically programmed to initiate Jog function while pressed and held in drive mode. Smart Trac AC1 output goes to programmed Jog Frequency to check motor operation, or to position the machine. When key is released, output returns to zero and motor stops. If motor is running, pressing this key will have no effect. May be programmed to be disabled if Smart Trac AC1 is programmed to use an external JOG input.
FWD/REV	*Programmable.* Typically programmed to toggle between motor run Forward and Reverse with each press of key. Selected direction is indicated by FWD or REV lights. If selection is made while Smart Trac AC1 is stopped, it determines direction motor will run when started. If selection is changed during running, Smart Trac AC1 will ramp motor to zero speed and then ramp it up to set speed in opposite (i.e. newly selected) direction.
RUN RUN	*Programmable.* Typically programmed to operate by external RUN and STOP signals (as indicated by REMOTE SEQ lamp being lit). Pressing key will produce a Run command to initiate Smart Trac AC1 output to motor. However, output frequency will be zero if frequency reference is zero at time key is pressed.
STOP **STOP**	*Programmable.* Typically programmed to produce a Stop command when key pressed. Smart Trac AC1 will decelerate motor in programmed stopping manner, then Smart Trac AC1 output will be disconnected from the motor.
MENU MENU	After power-up, displays top level of digital operator menu tree, Numeric Parameters. At the topmost level of five menus, it moves from menu to menu in the following order: Numeric Parameters, Numeric Feedbacks, Logic Parameters, Logic Feedbacks, and Special Functions. If within a submenu, returns to the topmost menu, Numeric Parameters.
ESC ESC	Returns display to previous level in menu tree or to status before pressing DATA/ENTER.
DATA/ ENTER DATA/ENTER	Moves to a submenu after selected with UP and DOWN arrow keys. Writes a keyed parameter value into Smart Trac memory.

Digital Operator Control Keys	
Key Label	**Function**
>RESET	Moves blinking cursor of a value being changed one digit to the right if modifying either a numeric parameter or the password. If at the right-most position, wraps around to first position on left side of display. OR Resets a Smart Trac AC1 fault or fault history list.
up arrow	Moves to a previous menu or submenu within a menu level. At the topmost level of five menus, it moves from menu to menu in the following order: Numeric Parameters, Special Functions, Logic Feedbacks, Logic Parameters, and Numeric Feedbacks
down arrow	Moves to the next menu or submenu within a menu level. At the topmost level of five menus, it moves from menu to menu in the following order: Numeric Parameters, Numeric Feedbacks, Logic Parameters, Logic Feedbacks, and Special Functions.

Using the Digital Operator

You may use the Up and Down arrow keys to move from menu to menu or submenu to submenu within a menu level.

When the Smart Trac AC1 is powered-up, the text window of the digital operator displays the message "Press the MENU key now…". Each press of the **MENU** key displays the next menu. There are five menus: **Numeric Feedbacks**, **Numeric Parameters**, **Logic Feedbacks**, **Logic Parameters**, and **Special Functions**. Each menu contains sub-menus.

1. To get familiar with the menu structure:

2. Press the ⎯⎯⎯ (**MENU)** key. The first menu, Numeric Parameters, appears.

3. Press ⎯⎯⎯ (**DATA/ENTER)**. You see the first numeric parameter, as programmed.

4. Press ⬃ (up arrow). You see the last numeric parameter, as programmed.

5. Press the **ESC** key. You are returned to the Numeric Parameters menu.

6. Press the ⬃ (**MENU)** key again. The second menu, **Numeric Feedbacks**, appears. Continue to press **MENU** through the **Logic Parameters** list, the **Logic Feedbacks** list, to the **Special Functions** menu list.

Parameter and Feedback Functions

You may review or set values of **Numeric Parameters**, **Numeric Feedbacks**, **Logic Parameters** and **Logic Feedbacks**. Details of how to set these the *Smart Trac AC1 Engineer's Guide*. Use the procedure described below to review or set maximum and minimum limits for parameters and feedbacks.

To review parameters or feedback values:

1. Press **MENU** on the digital operator. This puts you in the digital operator's main menu. The words **Numeric Parameters** appear, indicating you are in the Numeric Parameters menu.

2. Take one of the following two actions:

   a. If you want to review **Numeric Parameters**, press **DATA/ENTER**.

   b. If you want to review **Feedbacks** or **Logic Parameters**, press the **MENU** key again. The second menu, **Numeric Feedbacks**, appears. If you want to review Numeric Feedbacks, proceed to step 3. Otherwise, press **MENU** to **Logic Parameters**. Press MENU again to **Logic Feedbacks.** Press **DATA/ENTER** when at the values you want to review.

NOTE: You may also use UP and DOWN arrow keys to move between parameter and feedback submenus.

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3. Within a type of Feedback or Parameter, you may review all values by using the **UP** and **DOWN** arrow keys. Pressing **DATA/ENTER** at any parameter or feedback displays the value and units of that item. You may press **MENU** to return to the top-level menu and end your review or continue with this procedure to set limits.

To set maximum and minimum limits for a parameter or feedback:

4. Press **DATA/ENTER**. The question "**Maximum Limit?**" appears.

5. Answer **YES** if you want to set the maximum limit of that particular parameter or feedback.. You may enter the maximum value by entering a digit at a time and using the right arrow key to move to the next digit.

6. Answer **NO** to proceed to the question "**Minimum Limit**?: You may enter the maximum value by entering a digit at a time and using the right arrow key to move to the next digit.

7. When done, press **MENU** to return to the top-level menu.

Special Functions

The Digital Operator provides you with special functions that allow you to:

- review faults

- load default values

- set the system clock

- enter a password

- select the primary language used by the operator

- review or change TCP/IP settings

- check the firmware version used by the digital operator

A number from 1 to 9 is associated with each special function (see the Digital Operator Menu Tree). The numbers help you navigate through the menu tree.

To Display Faults

You can read any of the newest or oldest faults on the digital operator.

To view faults using the digital operator:

1. Press **MENU** on the digital operator. The words **Numeric Parameters** appear, indicating you are in the Numeric Parameters menu.

2. Press the **MENU** key again. The second menu, **Numeric Feedbacks**, appears. Continue to press MENU through the **Logic Parameters** list, the **Logic Feedbacks** list, to the **Special Functions** menu list.

3. Press **DATA/ENTER**. The submenu **Active Faults** appears.

4. Press the **DOWN** arrow key until you get to the fault submenu you'd like to review: **Active Faults**, **Oldest Faults, Newest Faults.** If you press the **DOWN** arrow key to many times you will step through other submenus. Pressing the **UP** arrow key takes you to the previous submenu.

5. Press **DATA/ENTER** to view the selected fault group. The display shows the fault label and the date and time it occurred. You can press the **UP** and **DOWN** arrows to view up to twenty active faults. Press **DATA/ENTER** a second time to view the decimal fault code number. Pressing **DATA/ENTER** within any fault submenu toggles between the fault label, date/time display and the decimal fault code display.

6. When done, press **Menu** to return to the top-level menu.

Display of Fault Information

While a connected drive is operating, the digital operator will show any Smart Trac AC1 or program faults before any other information and immediately when the fault occurs. The first fault to occur is displayed. Once *cleared*, by pressing any key on the digital operator, a second fault, if present, is displayed. Clearing acknowledges that the operator has been notified of the fault. When a fault is cleared, it is no longer annunciated, but is still active.

If a priority fault is cleared through the Smart Trac ARCNET LAN, it is immediately removed from the local display on the digital operator.

A list of active faults may be viewed. The faults remain on this list until their triggering condition is removed and **>RESET** is pressed.

Annunciated faults are also logged into the oldest and newest faults history lists. These lists can be viewed. Pressing **>RESET** while viewing one of the history lists will clear all the faults in that list.

Once active faults are reset, menu items will be displayed.

Loading Application Default Settings

You can choose to accept (or reset) all application settings as defined in your application program. These include defaults for Numeric Parameters and Logic Parameters.

To load the application settings using the Digital Operator:

1. Press **MENU** on the digital operator. The words **Numeric Parameters** appear, indicating you are in the Numeric Parameters menu.

2. Press the **MENU** key again. The second menu, **Numeric Feedbacks**, appears. Continue to press **MENU** through the **Logic Parameters** list, the **Logic Feedbacks** list, to the **Special Functions** menu list.

3. Press **DATA/ENTER.** The submenu **Active Faults** appears.

4. Press the **DOWN** arrow key three times or until you get to the submenu "**Load Defaults, press ENTER."** (Pressing the **UP** arrow key returns to the previous menu or submenu).

5. Press **DATA/ENTER**. The message "**Are you sure?"** appears with "**No-Keep Data"** below it.

6. Press **UP** or **DOWN** arrow keys and select between "**No-keep data"** and "**Yes-Load Default".** Press **DATA/ENTER** to select the indicated action. All application settings are loaded.

7. When done, press **Menu** to return to the top-level menu.

Setting the System Clock

You can use one of two methods to set the system clock. You can use the digital operator, explained below, or you can set it during bootup (see "The Boot Menu" in the *Smart Trac AC1 Technial Manual*).

To set the system clock using the digital operator:

1. Press **MENU** on the digital operator. The words **Numeric Parameters** appear, indicating you are in the Numeric Parameters menu.

2. Press the **MENU** key again. The second menu, **Numeric Feedbacks**, appears. Continue to press **MENU** through the **Logic Parameters** list, the **Logic Feedbacks** list, to the **Special Functions** menu list.

3. Press **DATA/ENTER.** The submenu **Active Faults** appears.

4. Press the **DOWN** arrow key several times until you get to the submenu **Set Clock**. Press **DATA/ENTER**. The current system date and time appear.

5. Press **DATA/ENTER**. The Date and Time flashes, ready to be changed to other values, if necessary. Enter each digit, in turn, using the right arrow key to move from one position to the right.

6. When you have entered the correct date and time, press **MENU** to return to the top-level menu.

Password Protection

To keep unauthorized personnel from changing parameters programmed into the Smart Trac AC1, the system employs a password.

To enter the password so that parameters may be changed:

1. Press **MENU** on the digital operator . The words **Numeric Parameters** appear, indicating you are in the Numeric Parameters menu.

2. Press the **MENU** key again. The second menu, **Numeric Feedbacks**, appears. Continue to press MENU through the **Logic Parameters** list, the **Logic Feedbacks** list, to the **Special Functions** menu list.

3. Press **DATA/ENTER**. The submenu **Language Select** appears.

4. Press the **UP** and **DOWN** arrow keys until you get to the submenu **Password Entry**.

5. Press **DATA/ENTER**. Your are prompted with "Enter the pswrd."

6. Enter "1099" and press **Data/Enter**. You may now return to the Main Menu (by pressing **MENU**) and change parameters.

7. When done, press **Menu** to return to the top level menu.

Selecting a Secondary Language

Your Smart Trac AC-1 may have been programmed to display legends and units in a *secondary*, or alternate, language. The *primary* language is always English and may not be changed. Either the primary (English) or secondary (alternate) language may be displayed by the user. You choose to use a secondary language in the **Special Functions** menu.

1. On the digital operator, press **MENU** until you get to the **Special Functions** menu.

2. Press **DATA/ENTER**. A message appears "**Set Language, press DATA/ENTER**."

3. Press **DATA/ENTER**. The message "**Present Language**" appears with either **English** or **Secondary** below it, indicating the language currently in use.

4. Press the **UP** or **DOWN** arrow keys until you reach the **English** or **Secondary Language** labels, depending on which you'd like to use. Press **DATA/ENTER** to select the use of the language.

5. When done, press **Menu** to return to the top-level menu.

Setting the TCP/IP Address

You can use the digital operator to view the IP Address, Subnet Mask and Gateway Address of the Smart Trac AC1 connected to the digital operator. You can set the TCP/IP address during bootup (see "The Boot Menu" in the *Smart Trac AC1 Technial Manual*).

To set the TCP/IP address using the digital operator:

1. Press **MENU** on the digital operator. The words **Numeric Parameters** appear, indicating you are in the Numeric Parameters menu.

2. Press the **MENU** key again. The second menu, **Numeric Feedbacks**, appears. Continue to press **MENU** through the **Logic Parameters** list, the **Logic Feedbacks** list, to the **Special Functions** menu list.

3. Press **DATA/ENTER.** The submenu **Active Faults** appears.

4. Press the **DOWN** arrow key several times until you get to the submenu **TCP/IP Settings**. Press **DATA/ENTER**. The current IP address appears.

5. Press the **DOWN** arrow. The Subnet Mask appears.

6. Press the **DOWN** arrow. The Gateway address appears. You may use the **UP** and **DOWN** arrow keys to move forward or backward within the submenu.

7. Press **MENU** to return to the top-level menu.

Checking the Firmware Version

You can check Boot Code, Monitor and Operating System firmware verions using the Digital Operator.

To set the view the firmware versions using the digital operator:

1. Press **MENU** on the digital operator. The words **Numeric Parameters** appear, indicating you are in the Numeric Parameters menu.

2. Press the **MENU** key again. The second menu, **Numeric Feedbacks**, appears. Continue to press **MENU** through the **Logic Parameters** list, the **Logic Feedbacks** list, to the **Special Functions** menu list.

3. Press **DATA/ENTER.** The submenu **Active Faults** appears.

4. Press the **DOWN** arrow key several times until you get to the submenu **Firmware Version**.

5. Press **DATA/ENTER**. The **Boot Code** version appears.

6. Press the **DOWN** arrow. The **Monitor** version appears.

7. Press the **DOWN** arrow. The **Operating System** version appears.

8. When you have entered the correct date and time, press **MENU** to return to the top-level menu. You may use the **UP** and **DOWN** arrow keys to move forward or backward within the submenu.

Viewing the COM1 Baud Rate

You may view the current baud rate configuration using the Digital Operator.

To view the COM1 baud rate:

1. Press **MENU** on the digital operator. The words **Numeric Parameters** appear, indicating you are in the Numeric Parameters menu.

2. Press the **MENU** key again. The second menu, **Numeric Feedbacks**, appears. Continue to press **MENU** through the **Logic Parameters** list, the **Logic Feedbacks** list, to the **Special Functions** menu list.

3. Press **DATA/ENTER.** The submenu **Active Faults** appears.

4. Press the **DOWN** arrow key several times until you get to the submenu **COM1 Config**.

5. Press **DATA/ENTER**. The **Baud Rate** configured for communications port 1 appears.

6. When done viewing the baud rate, press MENU to return to the top-level menu.

MagneTek

Programming Key Functions

You may program the control keys using any IEC-61131-3 compliant language available in the Smart Trac Workstation Development Environment. See Smart Trac Workstation Online Help for more information.
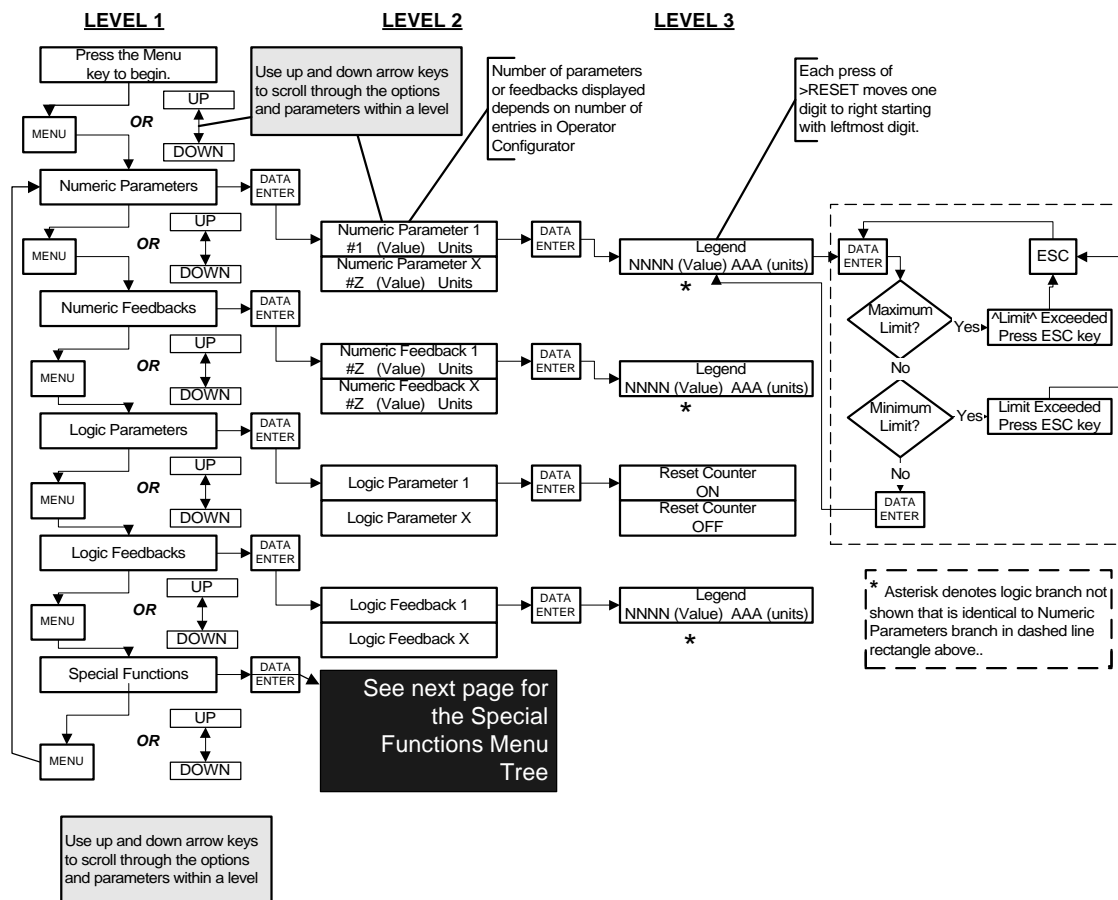
Digital Operator Menu Tree

Figure 7. AC1 Digital Operator Menu Tree

Digital Operator Special Functions
Menu Tree

Glossary of Terms

IP Address

The Internet Protocol, or IP, address is a unique, 32-bit number used to identify the host address and the network on which the host resides. The number is divided into four "octets" having decimal values from 0 to 256. The number is further subdivided into a Network ID and a Host ID, depending on the type of network. The Network ID is unique to the local network and the Host ID identifies a workstation, server, router, or other TCP/IP device within a network.

Gateway Address

The IP address to which data packets should be sent so those packets may be routed to their final destination. Typically, it is the address of a connecting point between a mainframe and a PC network.

Subnet Mask

A number used to identify a subnetwork so that an IP address can be shared among nodes of a local area network..

TCP/IP address

An addressing method used to specify the Network ID, for general location of the host, and the Host ID, which unquely identifies an individual host after the network is located. It further defines segments on the network. This information is used to route other information to its proper destination.

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SMART TRAC AC1 Digital Operator

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