



SmartTrak 100 Modbus



SmartTrak[®] 100 Modbus

Instruction Manual

Modbus Device Specification for SmartTrak[®]
Models: 100, 101, and 140
Mass Flow Meters & Controllers



Part Number: IM-100ModbusRev.V1
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Warnings and Cautions

Note and Safety Information

We use caution and warning statements throughout this book to draw your attention to important information.



Warning!

This statement appears with information that is important to protect people and equipment from damage. Pay very close attention to all warnings that apply to your application.



Caution! / Note!

This statement appears with information that is important for protecting your equipment and performance. Read and follow all cautions that apply to your application.



Warning! Agency approval for hazardous location installations varies between flow meter models. Consult the flow meter nameplate for specific flow meter approvals before any hazardous location installation.

Warning! All wiring procedures must be performed with the power off.

Warning! To avoid potential electric shock, follow National Electric Code safety practices or your local code when wiring this unit to a power source and to peripheral devices. Failure to do so could result in injury or death. All AC power connections must be in accordance with published CE directives.

Warning! Do not power the flow meter with the sensor remote (if applicable) wires disconnected. This could cause over-heating of the sensors and/or damage to the electronics.

Warning! Before attempting any flow meter repair, verify that the line is de-pressurized.

Warning! Always remove main power before disassembling any part of the mass flow meter/controller.



Caution! Before making adjustments to the device, verify the flow meter/controller is not actively monitoring or reporting to any master control system. Adjustments to the electronics will cause direct changes to flow control settings.

Caution! When using toxic or corrosive gases, purge the line with inert gas for a minimum of four hours at full gas flow before installing the meter.

Caution! The AC wire insulation temperature rating must meet or exceed 80°C (176°F).

Caution! Printed circuit boards are sensitive to electrostatic discharge. To avoid damaging the board, follow these precautions to minimize the risk of damage:

- before handling the assembly, discharge your body by touching a grounded, metal object
- handle all cards by their edges unless otherwise required
- when possible, use grounded electrostatic discharge wrist straps when handling sensitive components

Receipt of System Components

When receiving a Sierra mass flow meter, carefully check the outside packing carton for damage incurred in shipment. If the carton is damaged, notify the local carrier and submit a report to the factory or distributor. Remove the packing slip and check that all ordered components are present. Make sure any spare parts or accessories are not discarded with the packing material. Do not return any equipment to the factory without first contacting Sierra Customer Service.

Technical Assistance

If you encounter a problem with your flow meter, review the configuration information for each step of the installation, operation, and setup procedures. Verify that your settings and adjustments are consistent with factory recommendations. Installation and troubleshooting information can be found in the SmartTrak[®] 100 Series manual.

If the problem persists after following the troubleshooting procedures outlined in the SmartTrak 100 Series manual, contact Sierra Instruments by fax or by E-mail (see inside front cover). For urgent phone support you may call (800) 866-0200 or (831) 373-0200 between 8:00 a.m. and 5:00 p.m. PST. In Europe, contact Sierra Instruments Europe at +31 (0)72-5071400. In the Asia-Pacific region, contact Sierra Instruments Asia at +86-21-58798521. When contacting Technical Support, make sure to include this information:

- The flow range, serial number, and Sierra order number (all marked on the meter nameplate)
- The software version (visible at start up)
- The problem you are encountering and any corrective action taken
- Application information (gas, pressure, temperature and piping configuration)

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Chapter 1: Introduction

The SmartTrak 100 Modbus™ add-on module for Sierra Instruments' SmartTrak Series 100, 101, and 140 gas flow measurement and control instruments.

A variety of features enable the integration of the SmartTrak into a Modbus network environment.

Among these features:

- Access to all vital data
- Sophisticated alarm system
- Totalizer
- SmartTrak functionality monitor

Sierra Instruments provides a graphic application to setup the SmartTrak 100 Modbus features (see Appendix A). You can also access all the features in your application using Modbus compatible software.




Important Tip!

To fully understand the SmartTrak 100 Modbus and its functions, it is recommended that you also read the SmartTrak 100 Series instruction manual.

Chapter 2: Electrical Connections

All electrical connections are made on the left side of the SmartTrak 100 Modbus. The 15 Pin “P1” connector is used for instrument power and analog signals. See SmartTrak 100 Manual. The D9 “COM” connector is used for the Modbus-RTU RS-485, and hard wired addressing.

	Warning! Never connect a remote pilot module to the instrument when a SmartTrak 100 Modbus is mounted on it. Damage can occur.
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Pin Configuration

The image below shows the name of the connector and the location of “pin 1.”

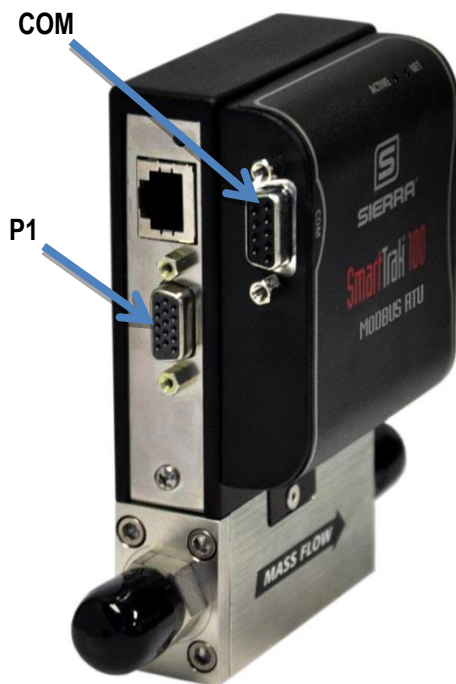


Figure 1 Pin Configuration

COM	
Pin#	Function
1 (arrow)	RS-485 Shield
2	+24V Power
3	ID0 – selection bit
4	ID1 – selection bit
5	RS-485 – B
6	ID2 – selection bit
7	Ground
8	ID3 – selection bit
9	RS-485 – A

P1	
Pin#	Function
1.	Analog Ground/ Output
2.	0-5 VDC Output (or 0-10, 1-5 VDC)
3.	Analog Ground/ RS232
4.	Valve Override Purge
5.	Power Return (-)
6.	Power Input (+)
7.	RS-232 Transmit (out)
8.	Setpoint
9.	Not Used
10.	Analog Ground/ Setpoint
11.	Reference Voltage (5 VDC External Setpoint & Valve Purge)
12.	Valve Override Close
13.	RS-232 Receive (in)
14.	4-20 mA Output
15.	Not Used
	Chassis (Earth) Ground



Note!

The pin out for P1 can be found in the SmartTrak 100 Series instruction manual.

Pins 1, 3, and 10 are connected together inside the instrument. Do not tie these grounds together outside the instrument. Must have one connection per analog ground. Recommended use listed.

During power-up or reset the ID pins (TTL compatible) are scanned. These pins set the Modbus ID address and will override the software set addresses.

Hardwired Network ID				
ID3	ID2	ID1	ID0	Modbus ID
open	open	open	open	Internal ID
open	open	open	GND	1
open	open	GND	open	2
open	open	GND	GND	3
-	-	-	-	
GND	GND	GND	GND	15

Instrument and SmartTrak 100 Modbus Power

The +24V (or optional PV1M 15VDC for meters) power and power return (GND) of the instrument and the SmartTrak 100 Modbus are connected internally through the 15 pin P1 connector.

Power supply requirements (ripple should not exceed 100mV peak to peak).

Instrument Type	Recommended Input Voltage (regulated)	Minimum mA Requirement
M100 (all)	15-24 Vdc ($\pm 10\%$)	230
C100L	24 Vdc ($\pm 10\%$)	500
C100L-HP	24 Vdc ($\pm 10\%$)	800
C100M	24 Vdc ($\pm 10\%$)	800
C100H	24 Vdc ($\pm 10\%$)	1260

RS-485 Connection



Caution!

The SmartTrak 100 Modbus is equipped with an optical isolated RS-485 interface. Don't connect the RS-485 shield to the ground of the power supply unless the isolated barrier isn't required.

General 2-Wire Topology RS-485 Network

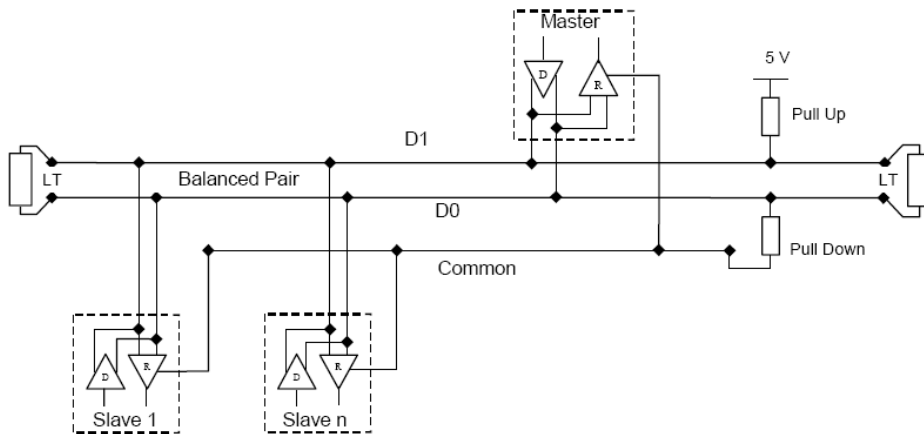


Figure 2 General 2-Wire Topology RS-485 Network

The “RS-485 – A” (also referred as ‘-’) is connected with the D0 line. The “RS-485 – B” (also referred as ‘+’) is connected with the D1 line. The shield is connected to the common line of the network. The use of line terminators depends on cable lengths and should be determined on site.

Daisy Chain Units

RS485 uses a daisy chain topology. It is important to avoid spur lines. Never connect a RS485 bus in a star configuration.

When connecting multiple units the following COM pins are used for the link cable

- 1 (RS-485 shield)
- 5 (RS-485 – B, D1)
- 9 (RS-485 – A, D0)

Cable

It is recommended to use a twisted pair type of cable (reduces radiated and received EMI). Category 5 cables may be used to a maximum length of 600 meters. To operate at cable lengths of 1000 meter it is advised to use AWG 26 or lower.

Terminator

Reflections in a transmission line can cause communication errors. To minimize the reflection it is required to place terminator resistors at both ends of the cable. Never place a terminator resistor somewhere along the cable; they need to be at the end of the bus. The use of line terminators depends on cable lengths and should be determined on site. Typical values for terminator resistors are 120-150 ohm * (0.5 W).

Line Polarization

In noise environments it may be necessary to polarize the lines to ensure that the receivers stay in a constant state when no signal is present. The polarization must be implemented at one location for the whole bus. The value for the pull up and pull down resistors is between 450 and 650 ohms * (a higher value permits more devices to be connected to the bus).



Note

For specific resistor values and other bus requirements consult your RS-485 master's documentation.

Chapter 3: Communicating

Once the SmartTrak 100 Modbus is wired to the network and powered up it is time to communicate with it.

The default settings for the Modbus interface are as following:

- ID code = 1-247 (or 1 – 15 depending on the COM 1 ID pin settings)
- Baud rate = 19200
- Parity = Even
- Number of bits = 8
- Stop bit = 1
- Delay between receiving and transmitting = 2 ms

Changing the settings can be done through the boot loader (Chapter 7) or special registers.

Power Up

When powered up the green LED on top of the SmartTrak 100 Modbus enclosure will flash twice. During this time it is possible to enter the boot loader (see Chapter 7 on boot loader for more information). After the flashing the red LED will light up indicating the initialization phase. During this time data is retrieved from the SmartTrak and stored into the SmartTrak 100 Modbus memory. There is no communication through Modbus possible at this stage.

Once all data is retrieved the red LED goes off and the green LED will start blinking as it receives data from the instrument. Communication through Modbus is possible now.

If the communication with the instrument is lost for some reason, the SmartTrak 100 Modbus will try to establish it again. During this phase the Modbus interface will not be active.

The red LED will light up every time a network message is received with the correct ID code.



Figure 3 LED's showing the activities of the SmartTrak 100 Modbus™

Data Format Various Registers

- 32 bit float (Real): IEEE 754 floating point, low/high word order
- BCD encoded: hex encoded decimal values f.i. 0x89 = decimal 89
- 8 & 16 bit integer: unsigned integer values
- 16 bits ASCII: ASCII encoded characters, high word = 1st character. 0x4944 = “ID”

Modbus Registers Overview

PDU Address	Register	Description	Read/Write	Data type	No. registers
Dynamic Data					
\$00	40001	Actual flow - low word	R	32 bits real	2
\$01	40002	Actual flow - high word			
\$02	40003	Set point - low word	R/W	32 bits real	2
\$03	40004	Set point - high word			
\$04	40005	Totalizer3,4	R/W (Reset)	BCD encoded	4
\$05	40006	Totalizer1,2	R		
\$06	40007	Totalizer7,8	R		
\$07	40008	Totalizer5,6	R		
\$08	40009	Valve power	R	16 bits int.	1
\$09	40010	Analog CH0	R	16 bits int.	1
\$0A	40011	Analog CH1	R	16 bits int.	1
\$0B	40012	Digital Data - IN	R	16 bits int.	1
\$0C	40013	Digital Data - OUT	R/W	16 bits int.	1
\$0D	40014	Alarm status	R/W	16 bit int.	1
Settings					
\$0E	40015	Factory f.s – low word	R	32 bits real	2
\$0F	40016	Factory f.s – high word			
\$10	40017	User f.s – low word	R/W	32 bits real	2
\$11	40018	User f.s – high word			
\$12	40019	Gas span – low word	R/W	32 bits real	2
\$13	40020	Gas span – high word			
\$21	40034	Gas index	R/W	8 bits int.	1
\$22	40035	Valve position index	R/W	8 bits int.	1
\$23	40036	Flow unit index	R/W	8 bits int.	1
\$24	40037	Password	R/W	16 bits int.	1
\$25	40038	Input set point index	R/W	8 bits int.	1
\$26	40039	Analog output index	R/W	8 bits int.	1
Static Data					
\$27	40040	Device firm rev – low word	R	32 bits real	2
\$28	40041	Device firm rev – high word			
\$29	40042	Device type	R	16 bits ASCII	1
\$2A	40043	Serial number – char 1,2	R	16 bits ASCII	4
\$2B	40044	Serial number – char 3,4			
\$2C	40045	Serial number – char 5,6			
\$2D	40046	Serial number – char 7,8			
\$2E	40047	Tag number - char 1,2	R	16 bits ASCII	5
\$2F	40048	Tag number - char 3,4			
\$30	40049	Tag number - char 5,6			
\$31	40050	Tag number - char 7,8			
\$32	40051	Tag number - char 9,10			

\$33	40052	Gas 1 – char 1,2	R	16 bits ASCII	8
\$3A	40059	Gas 1 – char 15,16			
\$3B	40060	Gas 2 – char 1,2	R	16 bits ASCII	8
\$42	40067	Gas 2 – char 15,16			
\$43	40068	Gas 3 – char 1,2	R	16 bits ASCII	8
\$4A	40075	Gas 3 – char 15,16			
\$4B	40076	Gas 4 – char 1,2	R	16 bits ASCII	8
\$52	40083	Gas 4 – char 15,16			
\$53	40084	Gas 5 – char 1,2	R	16 bits ASCII	8
\$5A	40091	Gas 5 – char 15,16			
\$5B	40092	Gas 6 – char 1,2	R	16 bits ASCII	8
\$62	40099	Gas 6 – char 15,16			
\$63	40100	Gas 7 – char 1,2	R	16 bits ASCII	8
\$6A	40107	Gas 7 – char 15,16			
\$6B	40108	Gas 8 – char 1,2	R	16 bits ASCII	8
\$72	40115	Gas 8 – char 15,16			
\$73	40116	Gas 9 – char 1,2	R	16 bits ASCII	8
\$7A	40123	Gas 9 – char 15,16			
\$7B	40124	Gas 10 – char 1,2	R	16 bits ASCII	8
\$82	40131	Gas 10 – char 15,16			
\$83	40132	Sensor data	R	8 + 8 bit int.	1
\$84	40133	Set unit to zero	R/W (\$A5)	8 bits int.	1
\$85	40134	Reset unit to factory default	R/W (\$A5)	8 bits int.	1

Special-Modbus Set Up

PDU Address	Register	Description	Read/Write	Type	No. registers
\$1003	44100	ID (1-247)	R/W	16 bit int.	1
\$1004	44101	Baud rate 1 = 4800, 2 = 9600 3 = 19K2, 4 = 38K4 5 = 57K6	R/W	16 bit int.	1
\$1005	44102	Parity 1=none, 2=odd, 3=even	R/W	16 bit int.	1
\$1006	44103	TX delay (milliseconds)	R/W	16 bit int.	1
\$1007	44104	Reset unit: Read value from this	R/W	16 bit int.	1

		register and write it back. This will reset the unit			
--	--	---	--	--	--

Registers Explained

The registers are divided into four groups. The first group (40001 – 40014) represents the dynamic data. This group changes the most. The second group (40015 – 40039) contains the settings from the instrument and SmartTrak 100 Modbus specific settings. The third group contains static data about the instruments. The last group (44100 – 44104) contains special functions to change the Modbus settings while the unit is in the network.

Registered Descriptions

40001: Actual Flow

The actual flow as measured by the instrument.

40003: Set Point

When using a controller the set point is shown. Writing to this register will set the set point. When a set point is entered which is beyond the full scale of the instrument then the set point will be changed automatically to the full scale value

40005 – 40008: Totalizer

Totalizer value BCD encoded. The first two registers are the value left of the decimal point. The last two registers represent the value behind the decimal point.

Example:

40005 = 0x0010

40006 = 0x1204

40007 = 0x1654

40008 = 0x4500

Total = 12040010.45001654

40009: Valve Power

Value representing the power injected into the valve (when using a controller). The value will range between 0 and 3200 (4095 when purging the valve).

40015: Factory Full Scale

Factory full scale value of the instrument

40017: User Full Scale

The user full scale value allows you to re-range the instrument. Any value between 50% and 100% of the factory full scale is allowed. The new value will also redefine the analog outputs of the instrument (when used). The 20mA/5 Vdc will represent the new full scale value.

40019: Gas Span

The gas span value allows you to adjust the 100% calibration point in the field. This is a correction factor, factory set to 1.000. This factor has an acceptable range of .500 to 2.00. This value will be returned to 1.000 if factory defaults are reset.

40034: Gas index

Value shows which gas is selected on the instrument. Value can range between 1 and 10. This specific index can be customizing when ordering. The default list is:

Value	Gas
1	Air
2	Argon (Ar)
3	Carbon Dioxide (CO ₂)
4	Carbon Monoxide (CO)
5	Methane (CH ₄)
6	Helium (He)
7	Hydrogen (H ₂)
8	Oxygen (O ₂)
9	Nitrogen (N ₂)
10	Nitrous Oxide (N ₂ O)

40035: Valve Position Index

Valve position index is the mode at which the valve of the controller will operate. The table shows the available values:

Value	Mode
1	Automatic
2	Closed
3	Purge

40036: Flow Unit Index

The value indicates the selected flow unit on the instrument. The table shows the available values:

Value	Unit
1	Sc/s
2	Sc/m
3	Sc/h
4	Ncc/s
5	Ncc/m
6	Ncc/h
7	SCF/s
8	SCF/m
9	SCF/h
10	NM ³ /s
11	NM ³ /m
12	NM ³ /h
13	SM ³ /s
14	SM ³ /m
15	SM ³ /h
16	Sl/s
17	Sl/m
18	Sl/h
19	Nl/s
20	Nl/m
21	Nl/h
22	g/s
23	g/m
24	g/h
25	Kg/s

26	Kg/m
27	Kg/h
28	Lb/s
29	Lb/m
30	Lb/h

40037: Password

Current password in the instrument. This password doesn't affect the SmartTrak 100 Modbus™.

40038: Input Set Point Index

Value indicates the source for the set point. The table shows the available values:

Value	Source
1	Digital (Modbus in this case)
2	0 – 5 volts
3	0 – 10 volts
4	1 – 5 volts
5	4 – 20 mA
6	0 – 20 mA



Caution!

Select RS-232 as source when the set point needs to be controlled through the network.

40039: Analog Output Index

Analog output index is the value which indicates the current selected analog output of the instrument. The table shows the available values:

Value	Output Option
1	0 – 5 Vdc / 4 – 20 mA
2	0 – 10 Vdc / 4 – 20 mA
3	1 – 5 Vdc / 4 – 20 mA
4	0 – 5 Vdc / 0 – 20 mA
5	0 – 10 Vdc / 0 – 20 mA
6	1 – 5 Vdc / 0 – 20 mA

40040: Firmware Revision

Firmware revision number of the instrument

40042: Device Type

There are two characters indication the type of instrument attached to the SmartTrak 100 Modbus™. The first character (high byte) indicates the version number of the Smart-Trak®. The second character (low byte) indicates if a meter 'M' or controller 'C' is attached.

Examples:

'2M' = Current SmartTrak - Meter ;

'1C' = Obsolete SmartTrak -Controller (serial numbers lower the 125,000)

40043 - 40046: Serial Number

Serial number of the instrument expressed as an eight character string.

40047 - 40051: Tag

Tag (or label) string which is set in the SmartTrak 100 Modbus™. The tag can only be set in boot loader mode and can be used f.i. to identify the instrument or its location.

40052 – 40059: Gas Name 1

40060 – 40067: Gas Name 2

40068 – 40075: Gas Name 3

40076 – 40083: Gas Name 4

40084 – 40091: Gas Name 5

40092 – 40099: Gas Name 6

40100 – 40107: Gas Name 7

40108 – 40115: Gas Name 8

40116 – 40123: Gas Name 9

40124 – 40131: Gas Name 10

Gas table present in the instrument.

40132: Sensor Data

Sensor data from the instrument. The high byte shows the bridge voltage and the low byte shows the bridge current.

40133: Set Unit To Zero

Writing the value 0xA5 to this register will zero the instrument. Make sure there is zero flow at your application pressure before using this command. 40134 below will return the unit back to the factory default zero.

40134: Reset Unit to Factory Default

Writing the value 0xA5 to this register will reset all your custom settings to factory defaults. The zero value and gas span values are cleared.

Special Modbus Set Up Registers

The Modbus settings for the SmartTrak 100 Modbus can be altered while it is connected to the network. Through special registers it is possible to change the settings. The settings can be changed but will not become active until a special write is performed.

44100: ID

The ID code as stored in memory is shown. The ID code set through the ID pins on P1 is not shown. Any value between 1 and 255 can be used.

44101: Baud rate

Value	Baud rate
1	4800
2	9600
3	19K2
4	38K4
5	57K6

44102: Parity

Value	Parity
1	None
2	Odd
3	Even

44103: TX delay

The value in this register will tell the SmartTrak 100 Modbus to wait a number of milliseconds before starting to transmit the reply to the master.

Delay time = value x 1ms

44104: Reset unit

Writing back the value read from this register will trigger two events:

1. The values entered for the ID code, baud rate, parity and TX delay will be stored in memory (making them permanent)
2. The SmartTrak 100 Modbus will perform a power-up reset reading the new settings

The new settings are now active. The new settings will not be stored unless the correct value is written to this register. When the settings are changed and a manual reset is performed then the old settings will be used.

Chapter 4: Bootloader

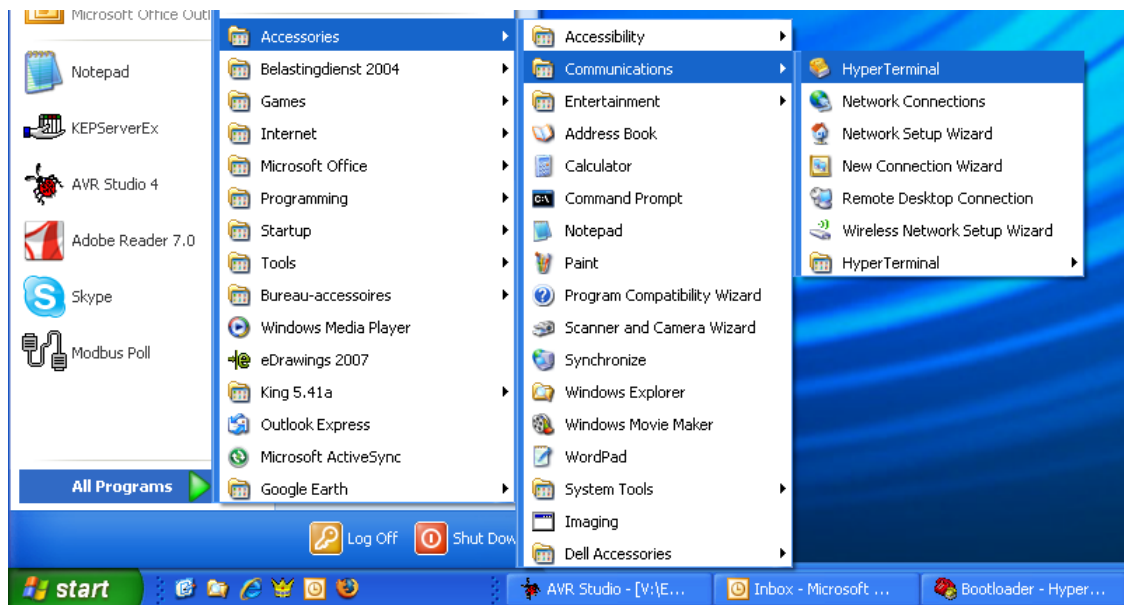
Introduction

This chapter describes how the boot loader is used. The boot loader makes it possible to set up applications and download firmware using a simple terminal program and a serial connection.

Getting Started

In order to use the Bootloader, a PC is needed which is equipped with an RS-485 interface or an external converter connected to the RS-232 port.

Connect the RS-485 interface of the SmartTrak 100 Modbus to the RS-485 interface of the PC. On the PC start a simple terminal program like HyperTerminal.



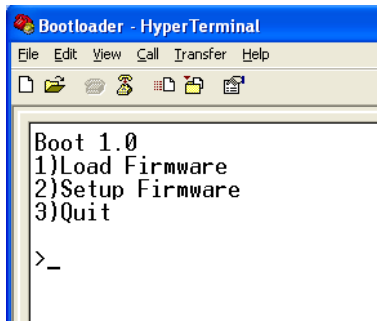
Start HyperTerminal from windows and select the com port to which the RS-485 interface is connected. Use the following settings:

Baud rate : 9600
Number of bits : 8
Parity : N
Stop bits : 1
Flow Control :None

The boot loader will only be active during the first 2 seconds after a power-up or reset. During power-up (or reset) the green LED will blink twice before executing the application. To enter the boot loader, follow the next steps:

1. Power up the unit
2. In HyperTerminal press the enter key within 2 seconds of power up (any other key will terminate the boot loader and will start the application)

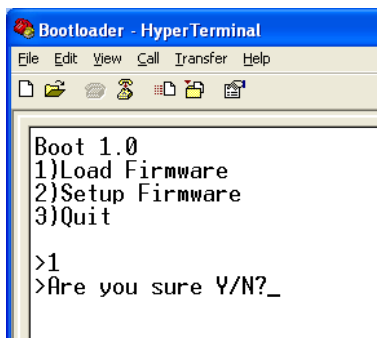
When the boot loader is activated successfully the green LED will stay on. The following menu will be presented on the screen:



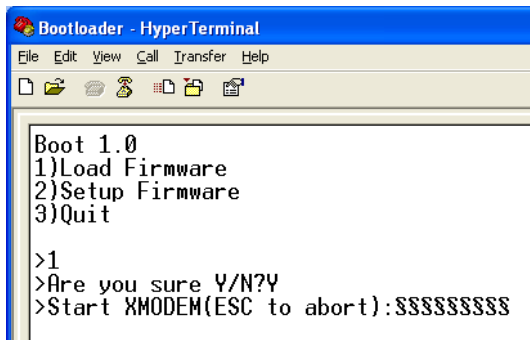
The version of the boot loader is shown and three options. By pressing the “1”, “2” or “3” key an option is selected.

Load Firmware (not typically required)

Press “1” to download new firmware to the unit. The following screen will be presented:

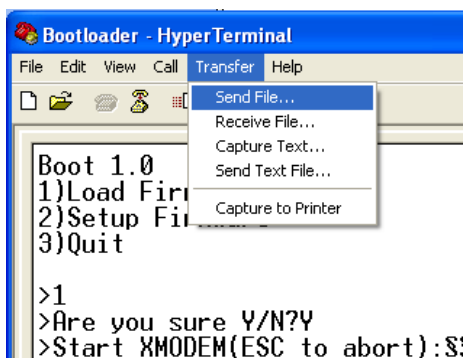


A question is presented asking to continue. Press the “Y” or “y” key to continue. Press “N” or “n” to abort. When continuing the following screen will be presented:

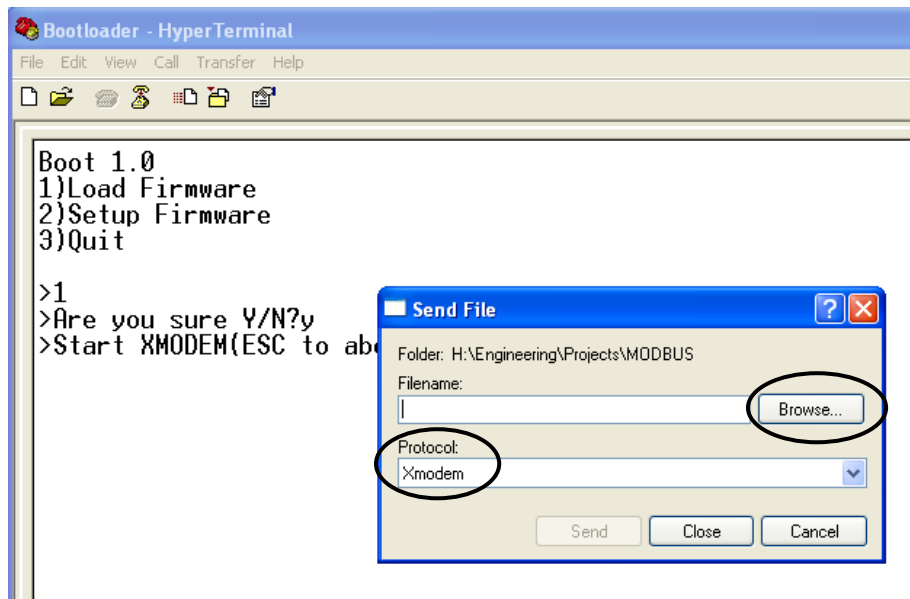


The screen will start to fill up with the “\$” character indicating that the XMODEM transfer can be started. Press the “ESC” key to abort.

From the “Transfer” menu select “Send file”




A new screen will be presented asking for the file to be transferred:

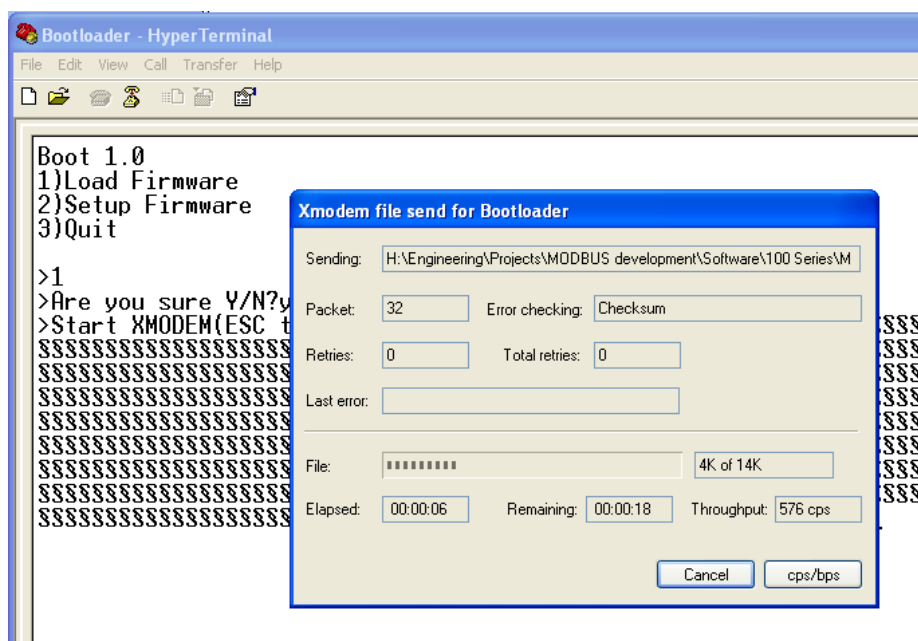


Use the “Browse” button to select the file to download. Only files with the “.hex” extension can be downloaded to the unit. Also make sure that the “Xmodem” protocol is selected. When the file is selected, press the “Send” button. The transfer screen pops up and the file download status can be monitored. During the download the green LED will be off will the red LED will be on.

If the download needs to be cancelled then simple press the “Cancel” button and then press the “Esc” key to return to the boot menu.

	Caution! Once the download has started it isn't possible to stop it. Doing so will result in losing the current application.
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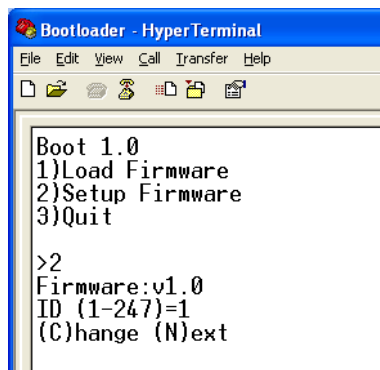
The download is now in progress:



When the download is finished the start-up screen will be shown again presenting three options.

Setup Firmware

This option is used to set up the firmware in the unit. When pressing the “2” key the following screen will be presented:



```
Boot 1.0
1)Load Firmware
2)Setup Firmware
3)Quit

>2
Firmware:v1.0
ID (1-247)=1
(C)hange (N)ext
```

The version of the firmware will be shown followed by the first option which can be set. It will show the current selected value as well which values can be entered.

In this above example, the ID code of the unit can be set between 1-247 and the current setting is 1.

Pressing the “C” or “c” key will prompt for a new value. Enter a new value and press the “Enter” key. The new value will be stored and the next option will be presented (if available). Data which can be entered must match the type presented. So in the above example only numbers can be entered. Characters will be ignored. Also the size of the entry will be limited depending on the maximum size allowed.

When all options have been viewed the default boot menu will be presented again. The options presented will depend on the firmware.

Default Firmware Settings

ID (1-247)=1
Baudrate (1=4800,2=9600,3=19K2,4=38K4,5=57K6)=3
Parity (1=None,2=Odd,3=Even)=3
Response delay (ms)=4
Tag=Inds-v13
FP byte order (0=4321,1=2143,2=1234,3=3412)=3
Enable ext. ID (0=off, 1=on) =1



Note!

While entering a new value the “backspace” key can be used to erase entered values.



Caution!

It is advised to only enter values which are shown between the brackets. Other values may be entered but could result in the unit not functioning correctly.

Quit

This option will quit the boot loader and will start the application.

Trouble Shooting

Problem	Solution
During the firmware transfer the download has halted and nothing is happening anymore (or an error message appears)	Reset the unit and try again. Make sure that only .hex files intended for the unit are selected
When trying the enter data the length is limited. No more data is excepted	For each option the data type and length are predefined. When data isn't accepted anymore than the maximum is reached. Also it's not possible to enter characters when numbers are expected (and vice-versa)
The characters on the screen are all messed up	Check the communication settings. They should be 9600,8,N,1
The unit doesn't enter the boot loader although the enter key is pressed within 2 seconds after start-up	Try swapping the "A" & "B" lines of the RS-485 connection and try again