Configuring an S2000 Reader via USB

Application Report

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Configuring an S2000 Reader via USB

Application Report

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This is the first edition of Configuring the S2000 Reader via USB.

It contains a description of how to establish communications with the S2000 and change its configuration using the USB port. For use with the following products:

RI-CTL-MB2B-30 ……**.. S2000 Control Module (RS-232)**
RI-CTL-MB6B-30 ……**... S2000 Control Module (RS-422/485)**

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This Application Report (11-06-26-011) is written for the sole use by TI Customers who are engineers experienced with Radio Frequency Identification Devices (RFID).

Conventions

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WARNING

A warning is used where care must be taken or a certain procedure must be followed, in order to prevent injury or harm to your health.

CAUTION

This indicates information on conditions, which must be met, or a procedure, which must be followed, which if not heeded could cause permanent damage to the system.

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Configuring the S2000 Reader via USB

ABSTRACT

With the addition of an USB port on the S2000 control modules, configuration of RS-485 readers is made much easier. Previously, it was necessary to use an RS-422 to RS-232 converter for the customization process, prior to installing the networked RS-485 units. The method described in this document uses 'Expert Mode' to write directly to the reader's E^2Prom (where the operating parameters are stored) and, rather than using S2_Util, uses Windows HyperTerminal as the GUI. Windows HyperTerminal has access to any serial port on which the USB driver might install.

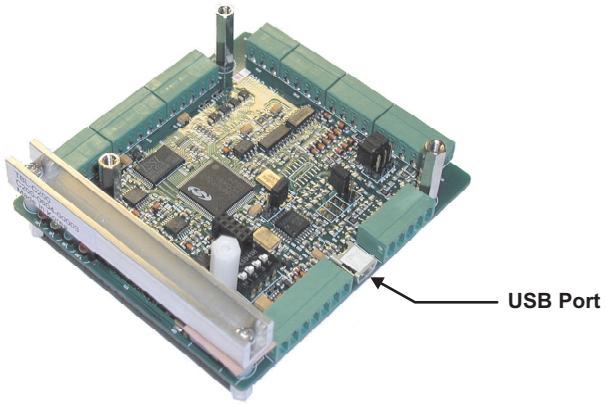


Figure 1. S2000 Control Module

1 Configuration Overview

On power-up the S2000 Reader reads in its operating parameters from E^2Prom. The default values for these locations are given in Appendix A.

Some of these parameters are Custom parameters that the user can change to ensure that the reader operates in the way the application requires. These Custom parameters only become active when dipswitch 1, 1 is in the ON position.

For configuration, this dipswitch must be in the OFF position.

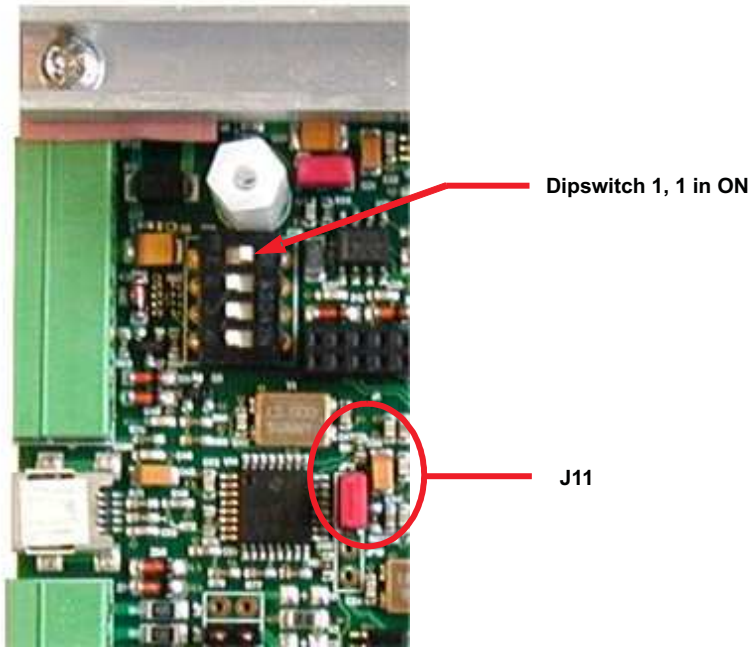


Figure 2. Location of Dipswitch 1, 1 and J11

1.1 The USB Interface

The USB interface is enabled by jumper J11, and this jumper must be in place for USB operation.

Before connecting the USB cable for the first time, it is necessary to install the USB drivers. This installation process is covered in Appendix B of this document.

1.2 Windows HyperTerminal

Any 'Dumb Terminal' Program can be used to configure the reader but this document describes using Windows™ HyperTerminal.

The normal location of HyperTerminal (Windows™ XP) is under Start → "All Programs" → "Accessories" → "Communications" → "HyperTerminal" as shown in Figure 3:

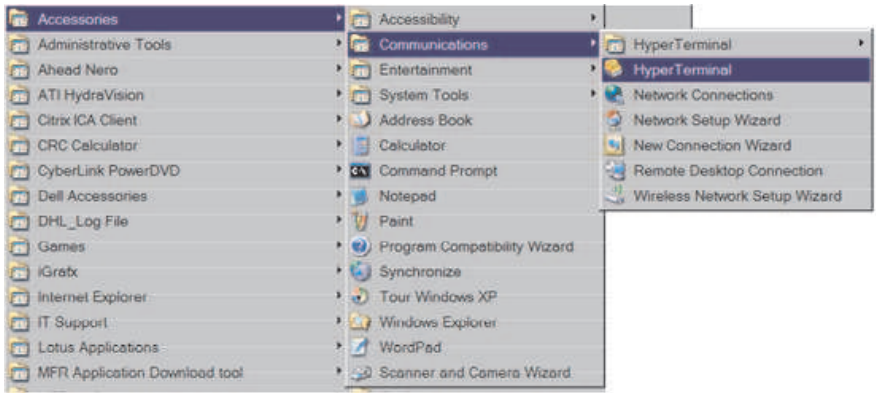


Figure 3. Locating Windows HyperTerminal

Click on HyperTerminal to start the program, and then select an icon and a name for the connection.

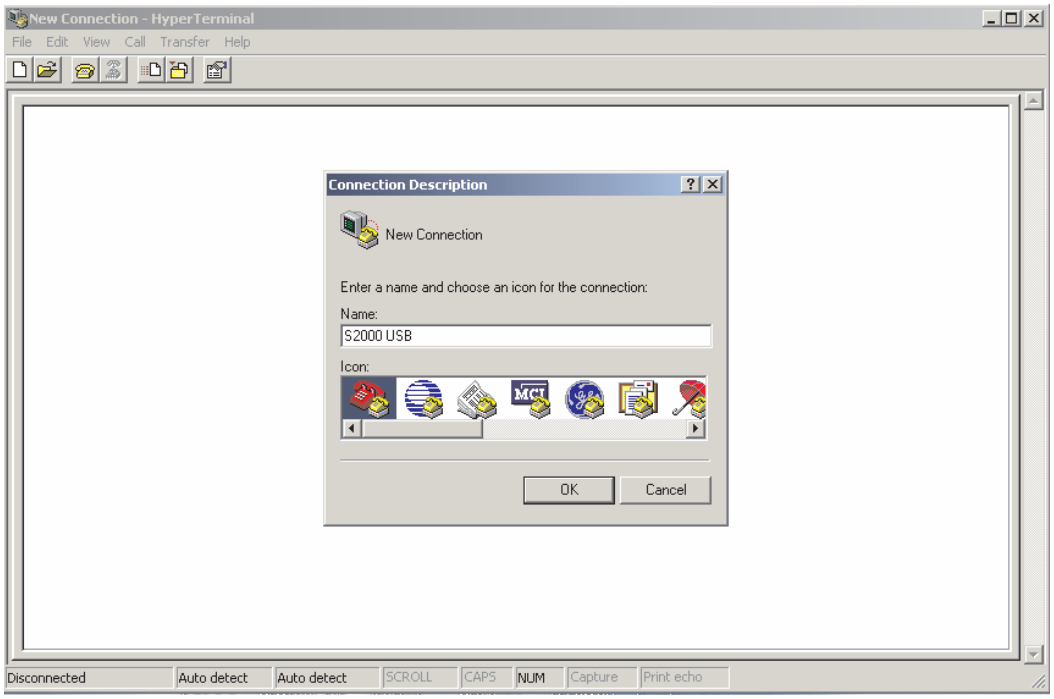


Figure 4. Starting HyperTerminal

When you click on "OK", you will be prompted to select a COM port and a drop-down list will show all valid ports. Select the COM port that your USB driver installed itself.

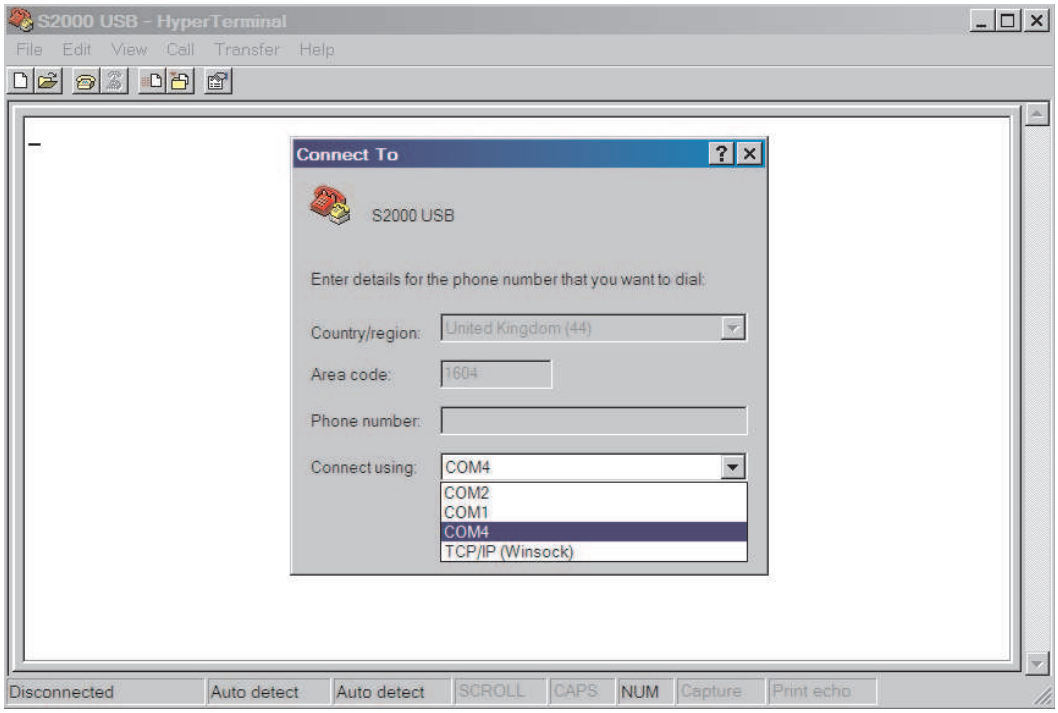


Figure 5. COM Port Selection

If you are unsure about which COM port to choose, then right click “My Computer” and select “Properties” → ‘Hardware’ → ‘Device Manager’.

Under “Ports (COM & LPT)” you will see which port the USB connection is using.

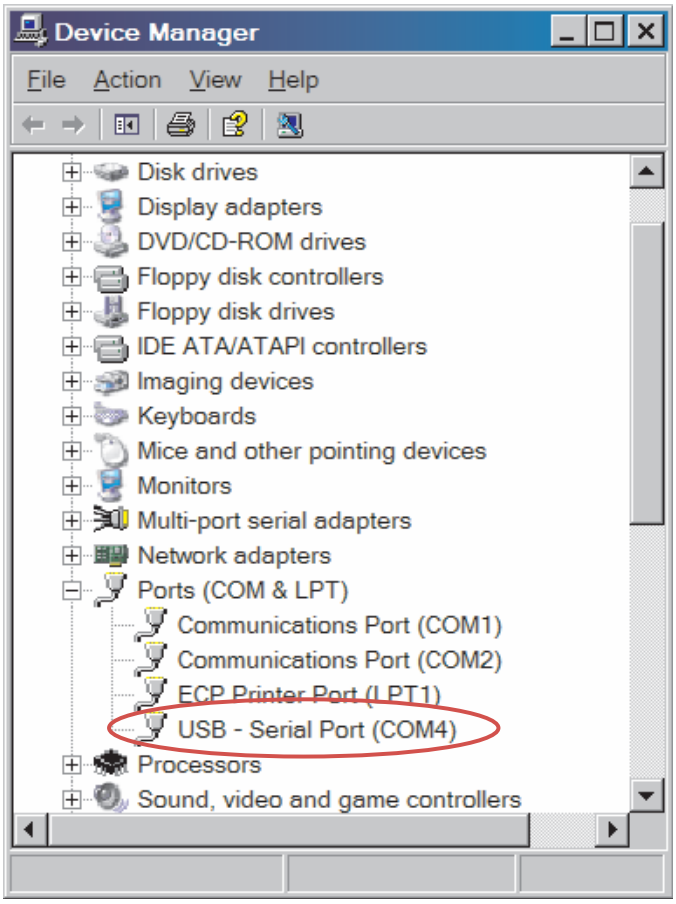


Figure 6. Ports (COM & LPT)

Click on “OK” and set the COM port properties as shown in Figure 7.

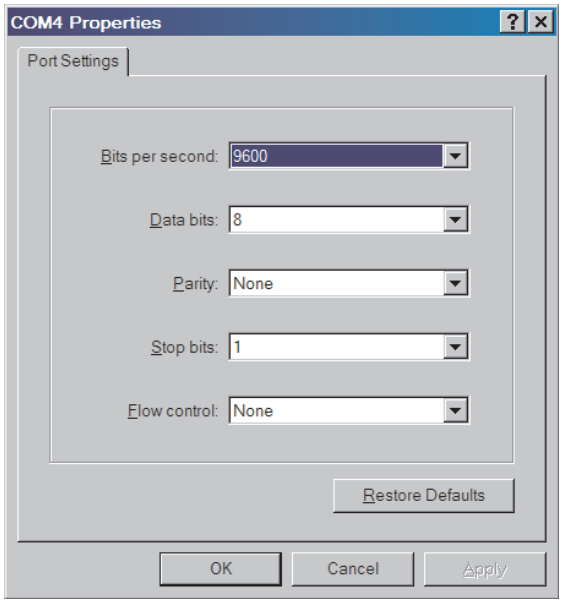


Figure 7. COM Port Parameters

Click on “Apply” followed by “OK”. Now under “Properties” on the top menu, select “Settings” → “ASCII Setup.

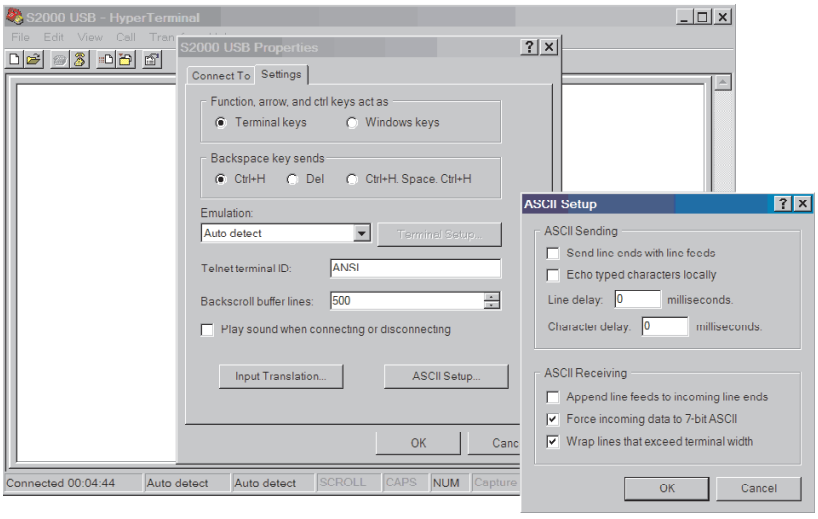


Figure 8. ASCII Setup

Make the changes as shown and Click “OK” twice.

You now should be able to send and receive data from the reader. Confirm this by typing “V” (upper case V) and the reader will return its version number.

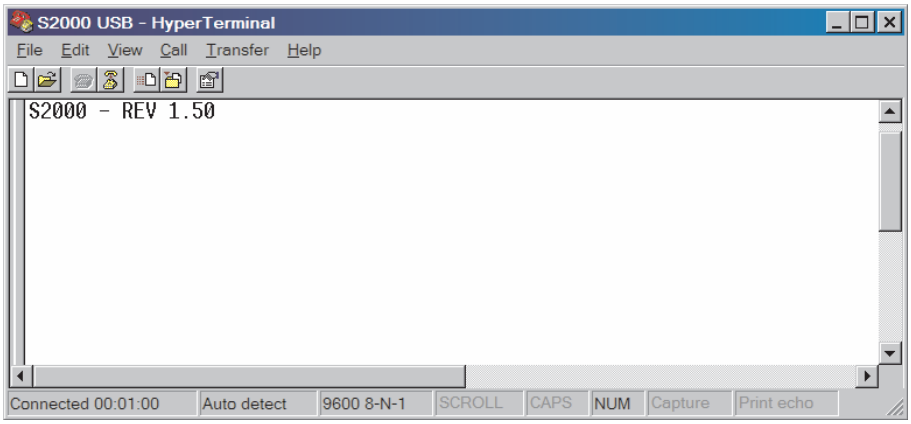


Figure 9. Checking Communications

1.3 Configuration

To start “Expert Mode” configuration, type an asterisk (*).

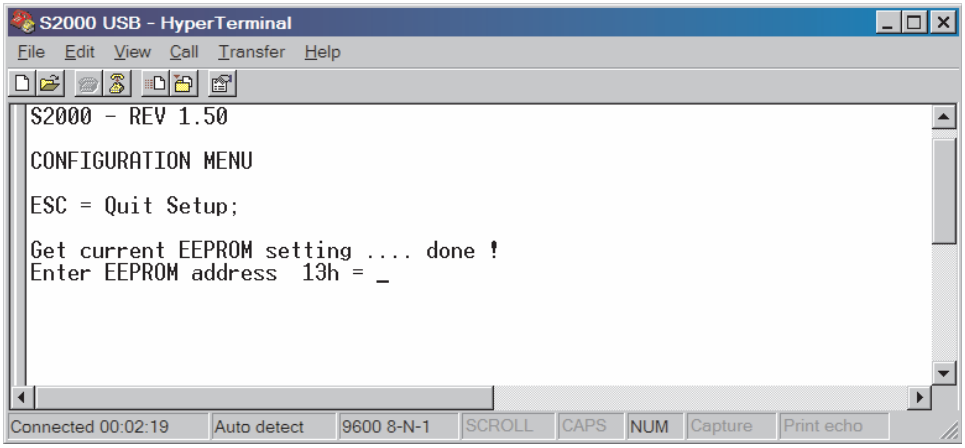


Figure 10. Starting 'Expert Mode'

This causes the reader to display the Configuration menu and prompts you for the EEPROM location you want to change. The location displayed defaults to 13h which is the start of memory locations that can be customized. Hitting RETURN will cause the program to assume that you want to start at 13h and will display its present value. Alternately, you can type in a location that you want to start making changes (e.g. 17) followed by RETURN and the program will display that location and its present value. You are prompted to type in a new value. Figure 11 shows this.

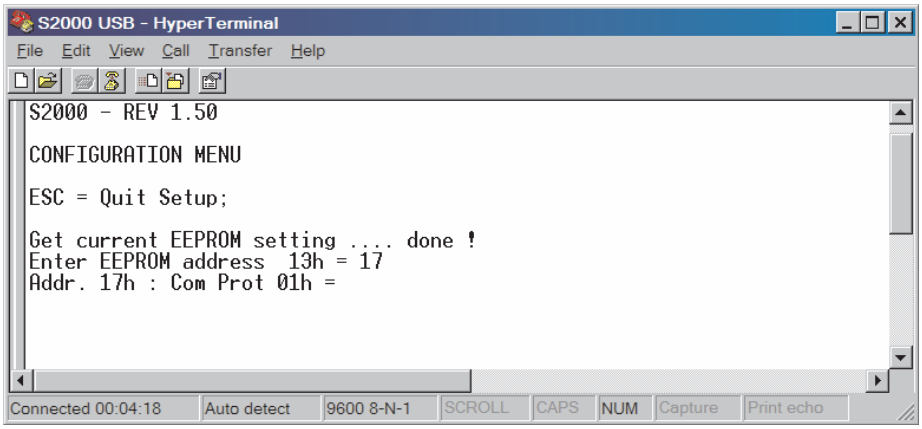


Figure 11. Selecting a Location

Typing in a value and hitting RETURN, causes that value to be stored in a temporary file. Just hitting RETURN assumes that you want to keep the original values and move to the next location. In this way you can move through the memory locations making the changes that you need. When you are satisfied that you have made all the changes that you need, hitting ESC causes the program to display the Exit options:

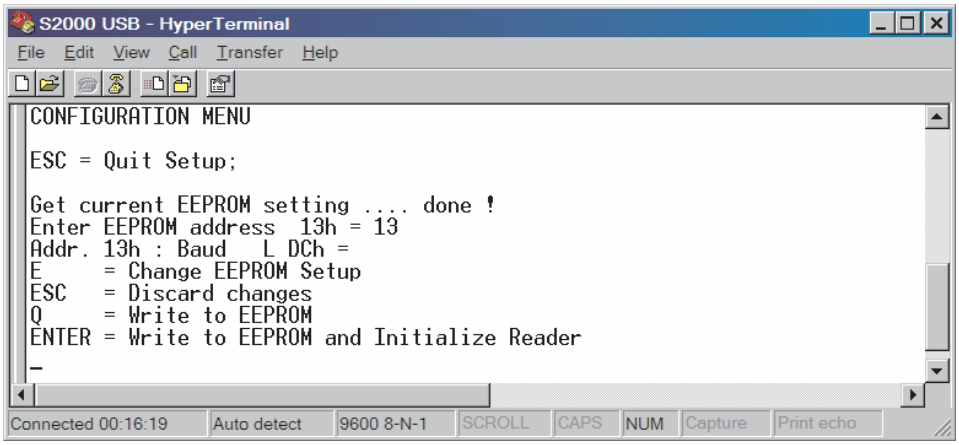


Figure 12. Configuration Exit Options

Hitting ESC will ignore any changes you have made, while “Q” or ENTER will write the configuration file, in which your changes have been collected, to the reader and initialize it. Hitting “E” will take you back to one location after the last location you selected, to continue configuration.

2 EEPROM Addresses

The reader comes with both standard and custom configurations pre-configured, e.g. If you change dipswitch 1, 1 to ON, the reader will automatically go into Tiris Bus Protocol mode. So, when configuring the reader to use the custom parameters you have selected, you will also have to check all other locations. For example you may have to change TBP back to ASCII if the only change you wish to make is to increase the baud rate.

In 'Expert Mode' all data is entered in Hexadecimal format, which is indicated by 'h', e.g. 13h. So for example if you are changing the Charge-up time (address 28h) to a 30 ms period you would enter 1E.

2.1 EEPROM Addresses Explained

In the following sections the custom addresses are explained.

2.1.1 Baud Rate (Addresses 13h and 14h)

These addresses define the baud rate when the custom configuration is active. The baud rate should be set to match the Host Computer.

Table 1. Baud Rate Settings

Baud rate	Address 13h	Address 14H
57600	FA	FF
38400	F7	FF
19200	EE	FF
9600	DC	FF
4800	B8	FF
2400	70	FF
1200	E0	FE
600	C0	FD

The default values for 13h and 14h are DC and FF respectively (9600 baud).

2.1.2 Communications Parameters (Address 15h)

At this address the communications parameters can be set to match those of the controlling computer.

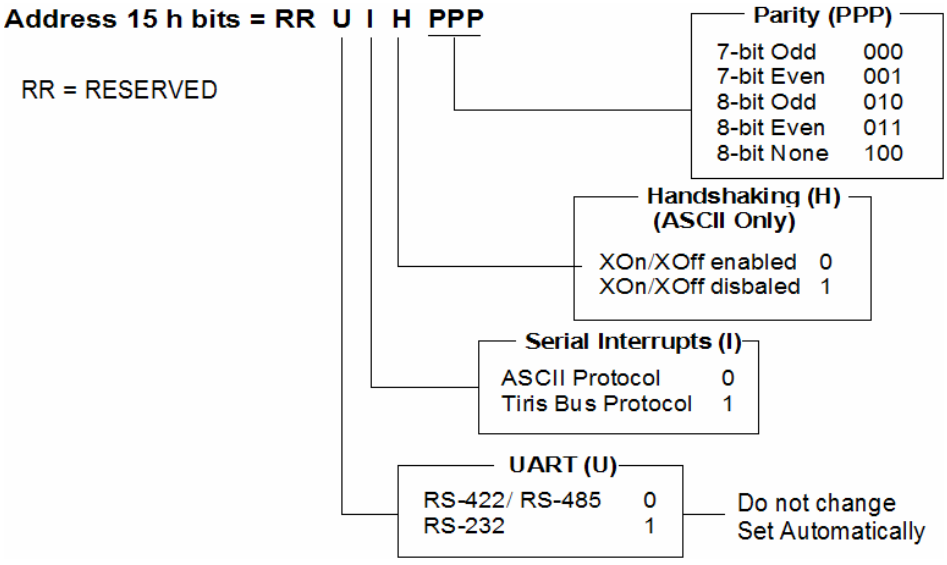


Figure 13. Communications Parameters

The default value for address 15h is 04 (8-bit None, XOn/ XOff enabled, ASCII Protocol).

2.1.3 Communication Interface (Address 16h)

Here the physical interface can be selected.

Note: When using the custom settings, RS-422 and RS-485 readers which are configured by default as RS-232, must be configured to the correct physical interface.

Table 2. Communication Interface

Physical Communication Interface	Address 16h
RS-232	00
RS-422	01
RS-485	02

The default value for address 16h is 00 (RS-232).

2.1.4 Communications Protocol (Address 17h)

This parameter specifies which protocol the reader will use when the custom settings are active. The ASCII Protocol is a simple, low overhead protocol, with no error detection. It is used for short distance communication in low noise environments – it is point-to-point only. TIRIS Bus Protocol (TBP) is a more complex protocol, with a larger overhead and error detection. TBP must be used for multi-drop connectivity.

Table 3. Communications Protocol

Communication Protocol	Address 17h
ACII Protocol	00
TBP	01

The default value for address 17h is 01 (TBP protocol).

2.1.5 ASCII Protocol Read Mode (Address 1Ah)

When configured for ASCII protocol, the reader can operate in a number of modes on power-up or a RESET.

- **Line mode** – the reader is constantly reading and returning responses to the Host computer, even when no tags are in the RF field.
- **Gate mode** – the reader checks to see if the tag ID is new or has been read before. Only new tag numbers are returned to the Host Computer. Over 900 IDs can be stored in memory for comparison.
- **Execute mode** – the reader only responds when requested and is silent otherwise.
- **Normal/ Differential mode** – when a new tag is read, the ID is sent to the Host Computer and the reader stores that value in memory. All subsequent readings are compared with that value and no data will be output until the value read changes.

Table 4. ASCII Protocol Read Mode

ASCII Protocol Read Mode	Address 1Ah
Line Mode	4C
Gate Mode	47
Execute Mode	58

Table 4. ASCII Protocol Read Mode (continued)

ASCII Protocol Read Mode	Address 1Ah
Normal/ Differential Mode	1B

The default value for address 1Ah is 1B (Normal/ Differential mode).

2.1.6 ASCII Protocol Control Byte (Address 1 Bh)

This address controls the data output to the Host Computer and Toggle Mode. The data output in ASCII mode can be decimal or hexadecimal. In hexadecimal the ID is represented by 16 characters, e.g. 1234567890ABCDEF, while in decimal the same ID will be sent as 20 characters, i.e. 0291 1220975730085359.

Toggle mode is no longer valid. It was used to switch between two receive antennas on an RFM-104B module. This module is now obsolete.

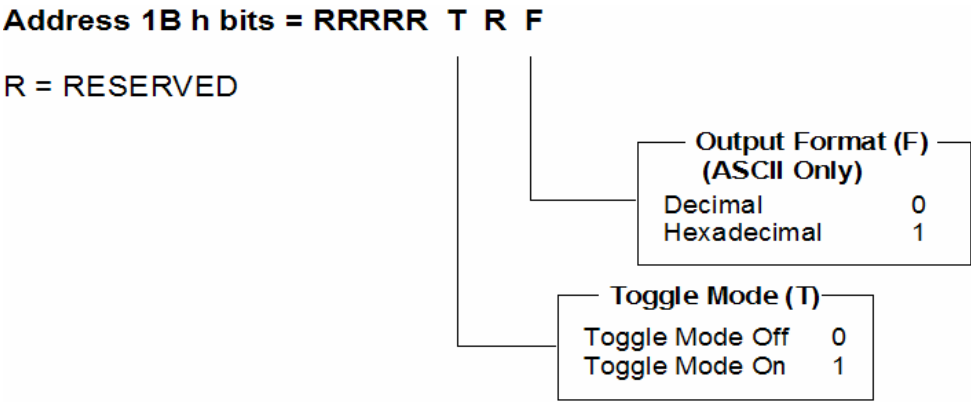


Figure 14. ASCII Protocol Control Byte

The default value for address 1Bh is 00 (Decimal output, Toggle Off).

2.1.7 ASCII Protocol General Purpose (Address 1 Ch)

Setting this parameter is only necessary when the S2000 reader is used as an end-of-line tester for automotive DST keys. If the response to an encoded challenge is correct, Open Collector OC0 is switched on if this address is set to 01.

Table 5. ASCII Protocol General Purpose

Open Collector Control	Address 1Ch
Output Control Off	00
Output Control On	01

The default value for address 1Ch is 00.

2.1.8 TBP Reader ID (Address 20h)

This parameter uniquely identifies a reader, when multiple readers are on the same RS-422 or RS485 network. The Tiris Bus Protocol uses this address to direct commands to a particular reader. Any address is allowed between 00 to FE but it is suggested that address 00 is reserved for the Host Computer. Address FF is for broadcast commands and should not be set as a reader's address.

Table 6. TBP Reader ID

TBP Reader ID	Address 20h
Reader Identification	00 – FE

The default value for address 20h is 01.

2.1.9 TBP Inter-Byte Timeout (Addresses 21h and 22h)

This parameter specifies the inter-byte timeout period which changes with baud rate. The value of this parameter will be determined by the baud rate set in 13h and 14h.

Table 7. TBP Inter-Byte Timeout

Baud	Address 21h	Address 22h
57600	69	FE
38400	9E	FD
19200	3E	FB
9600	7E	F6
4800	FD	EC
2400	FA	D9
1200	F7	B3
600	EF	67

The default values for addresses 21h and 22h are 7E and F6 (9600 baud).

2.1.10 TBP Read Mode (Address 23h)

In Tiris Bus Protocol, two read modes are possible:

- **Idle Mode** – this is equivalent to 'Execute mode' in the ASCII protocol, where the reader is not allowed to perform any operation until instructed. The reader waits until a command addressed to it (or a broadcast command) is received.
- **Gate Mode** – the reader is constantly attempting to read tags and storing the IDs in memory. (Note: where multiple readers are operating in this mode in close proximity, their transmissions will need to be synchronized).

Table 8. TBP Read Mode

TBP Read Mode	Address 23h
Idle Mode	00
Gate Mode	01

The default value for address 23h is 00.

2.1.11 TBP Control Byte (Address 24h)

This parameter specifies the algorithm used to determine the block check character. This can be a 16-bit CRC-CCITT polynomial checksum or a Longitudinal Redundancy Checksum (LRC) or Custom CRC. The 16-bit CRC-CCITT is recommended but where the controlling device, e.g. PLC, would have difficulty calculating the CRC, the less demanding LRC could be used.

Table 9. TBP Control Byte

TBP Control Byte	Address 24h
CRC-CCITT	00
LRC	01
Custom CRC	03

The default value for address 24h is 00.

2.1.12 Synchronization Type (Address 27h)

To prevent adjacent readers' transmissions interfering with one another in an application, some form of synchronization is required. This address allows the type of synchronization to be specified.

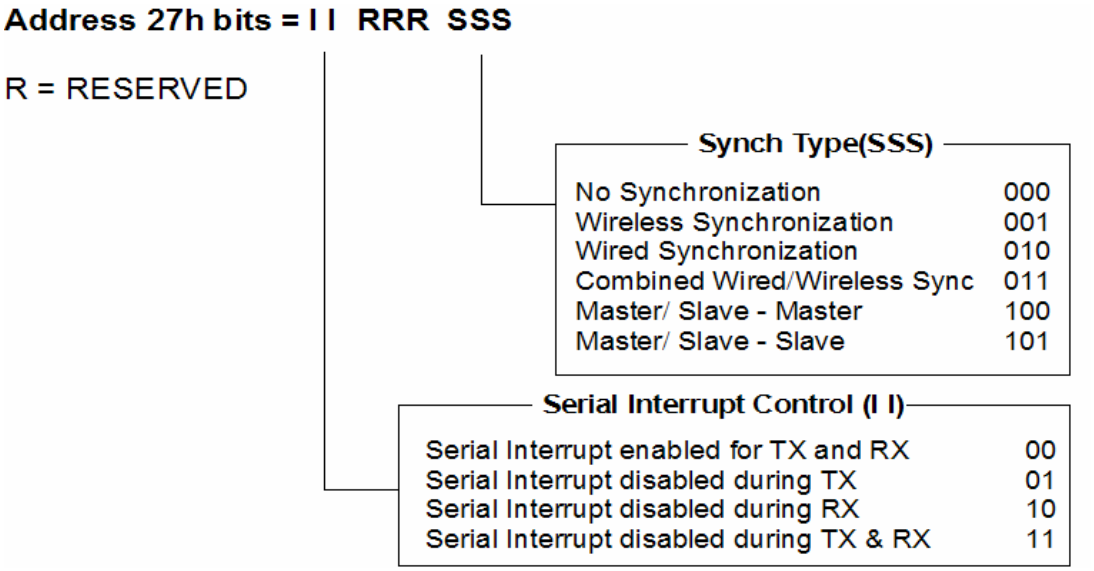


Figure 15. Synchronization Type and Interrupts

The default value for address 27h is 01.

2.1.13 Transponder Charge-Up Period (Address 28h)

To activate a tag, the reader must first raise the voltage in its charge capacitor. The time for the capacitor to be fully charged depends on the type of transponder and its distance from the reader's antenna. For normal operation the charge time is set to 50 ms but for high speed operations using larger transponders this time may be reduced to increase the speeding speed.

Table 10. Transponder Charge-Up

Transponder Charge-up Time	Address 28h
Charge Time	0F – FF

If the reader is constantly reading (Normal, Gate or Line mode) this time can be reduced as low as 15 ms but for Execute mode, we recommend a minimum time of 25 ms.

Note: Extending the charge time beyond 50 ms may result in the reader overheating. Any increase in transmitter on-time must be balanced by increasing the time between reads.

The default value for address 28h is 32h (50 ms decimal).

2.1.14 Transponder Write Timings (Addresses 29h – 30h)

The reader passes data to a tag by modulating (Off/On keying) the carrier signal. The ratio between the on-time and off-time tells the tag if it is a high-bit or low-bit. The following addresses set those timing values.

Table 11. Transponder Write Timings

Address	Parameter	Value
29h	L_{offL}	40
2Ah	L_{offH}	FF
2Bh	H_{offL}	B8
2Ch	H_{offH}	FC
2Dh	L_{onL}	4E
2Eh	L_{onH}	FA
2Fh	H_{onL}	DA
30h	H_{onH}	FC

The default values for addresses 29h to 30h are shown in Table 11.

2.1.15 RFM Type (Address 31h)

The Radio Frequency Module (RFM) parameters reference different models or modes of operation:

- **S2000 RFM 004 Low Temperature/Power RFM 007** – Users should choose this option for the RFM-007B and RFM-008B.
- **Mini RFM 003 Low Power (S2000 only)** – It is possible to drive the RFM-003B from the S2000 control module using a special adaptor. This is the option for the mini-RFM at low power.
- **Mini RFM 003 High Power (S2000 only)** – It is possible to drive the RFM-003B from the S2000 control module using a special adaptor. This is the option for the mini-RFM at high power
- **S2000 RFM 004 High Temperature (S2000 only)** – This is an obsolete mode and should not be used.

Table 12. RFM Type

RFM Type	Address 31h
S2000 RFM-007B/ RFM-008B	00
S2000 with RFM-003B Low Power	01
S2000 with RFM-003B High Power	02
Obsolete mode (do not use)	03

The default value for address 31h is 00.

2.1.16 Synchronization Timeout (Addresses 32h and 33h)

These parameters specify the time period that the reader will wait between sending subsequent data bits to a tag during a write process. These values are in ms and are required for Master Slave synchronization.

Table 13. Synchronization Timeout

Sync Timeout	Address 32h	Address 33h
Timeout value	34	F5

2.1.17 Transponder Programming Burst Period (Address 34h)

When data is written to a tag, that data has to be 'blown' into EEPROM. To ensure successful programming of the EEPROM, the transmitter is turned on 100% during this process. This burst, which is in ms, is also required for locking operations.

Table 14. Transponder Programming Burst

Transponder Programming	Address 34h
Burst Period	01 – FF

The default value for address 34h is 0E.

2.1.18 Transponder Encrytion Burst Period (Address 35h)

When a challenge is sent to a Digital Signature Transponder (DST), it has to run the challenge through its encryption routine before returning a digital signature. To ensure the tag has enough energy for this process, the transmitter is turned on 100% during this operation.

Table 15. Transponder Encryption Burst

Transponder Encryption	Address 35h
Burst Time	01 – FF

The default value for address 35h is 05

2.1.19 Duty Cycle Pause (Addresses 38h and 39h)

The Duty Cycle Pause is the time between the end of one charge period and the start of the next. The time is in ms.

Note: For the duty cycle pause to have any effect it must be longer than the default delay which comprises the received time, the data processing time and any synchronization delay.

Table 16. Duty Cycle Pause

Address	Duty Cycle Parameter	Value
38h	Low Byte	00 – FF
39h	High Byte	00 – FF

The default values for addresses 38h and 39h are 00 and 00 respectively. This instructs the reader not to add any Duty Cycle delay.

2.1.20 Default Multipage Transponder Page (Address 3Ah)

This parameter specifies the MPT page that must be read after a power cycle or RESET if the custom parameters are active. If this parameter is zero, a charge-only read is performed.

Table 17. MPT Page

Multi-Page Transponder	Address 3Ah
Page number	00 – 3F

The default value for address 3Ah is 00.

2.1.21 I/O Direction (Address 3Eh)

This parameter specifies the configuration of the 8 digital I/O ports 0 – 7, if the custom configuration is active.

Table 18. I/O Direction

I/O 0 – 3	I/O 4 – 7	Address 3Eh
Outputs	Outputs	00
Inputs	Outputs	01
Outputs	Inputs	02
Inputs	Inputs	03

The default value for address 3Eh is 01.

2.1.22 Default I/O Output (Address 3Fh)

This parameter sets the outputs at power-up or RESET.

Table 19. Default I/O Output

Default I/O Outputs	Address 3Fh
Value	00 – FF

Examples Set Outputs 0, 1, 2, 3 = 0F

Set Outputs 4, 5, 6, 7 = F0

Set Outputs 1, 6, 7 = C1

2.1.23 Default Control Output (Address 40h)

This byte is reserved for future use. Default value is 00.

2.1.24 Millisecond Timer (Addresses 45h and 46h)

These bytes specify the Software pre-scaled timer to give a resolution of 1 ms.

Table 20. Millisecond Timer

Address	Millisecond Timer	Value
45h	Low Byte	84
46h	High Byte	FC

2.1.25 Multiplexer Control Byte (Address 4Bh)

This parameter sets the multiplexer control byte. When this byte is set, the reader will cycle its I/O to change the multiplexer channels according to the settings in 4Ch.

Table 21. MUX Control Byte

Address	Mode	Value
4Bh	MUX Inactive	00
	MUX Active	01

The default value for address 4Bh is 00.

2.1.26 Multiplexer Antennas (Address 4Ch)

This parameter defines the number of MUX transmit and receive antennas that the reader is controlling.

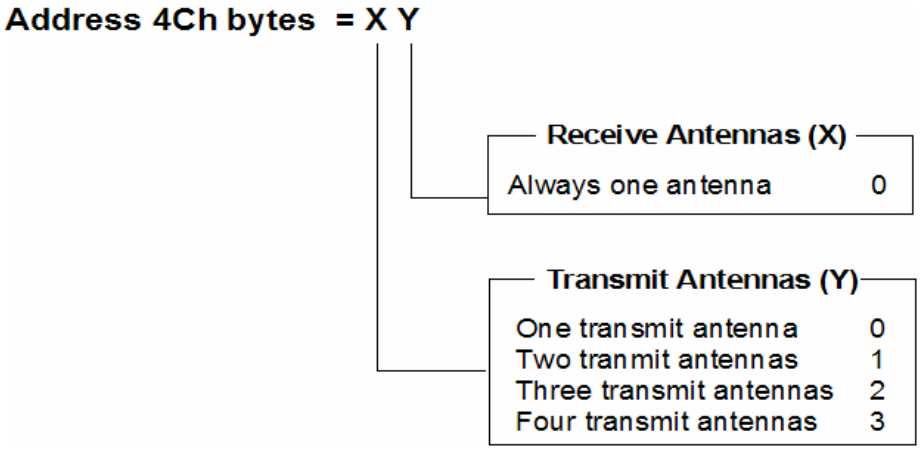


Figure 16. MUX Antennas

The default value for address 4Ch is 00.

2.1.27 DST RF-Opcode (Address 50h)

This parameter specifies the DST type and read mode. If Selective Read is configured, the Selective Address has to be specified at address 51h.

Table 22. DST RF-Opcode

DST Type & Read Mode	Address 50h
General Read of DST-A	40
Selective Read of DST-A	44
General Read of DST-B	4B
Selective Read of DST-B	4C

The default value for address 50h is 40.

2.1.28 DST Selective Addresss (Address 51h)

If on power-up the reader is required to Selectively Read DST's, then the Selective address must be given here.

Table 23. DST Selective Address

DST Operation	Address 51h
Selective Address	00 – FF

The default value for address 51h is 00.

2.1.29 DST Challenge (Address 52h – 56h)

End-of-line testers for DST enabled automotive keys need to confirm that the encryption process is working correctly. In addresses 52h to 56h a challenge can be hard-coded and the expected response to that challenge can be given in locations 57h to 59h.

Table 24. DST Challenge

Addresses	Challenge	Value
52h	DST Challenge Byte 0	00 to FF
53h	DST Challenge Byte 1	00 to FF
54h	DST Challenge Byte 2	00 to FF
55h	DST Challenge Byte 3	00 to FF
56h	DST Byte 4	00 to FF

The default Challenge (addresses 52h to 56h) is 0000000000.

2.1.30 DST Expected Response (Addresses 57h to 59h)

When the DST response matches the response in addresses 57h to 59h, if address 1C is set, an Open Collector output will be activated.

Table 25. DST Response

Addresses	Response	Value
57h	Expected Response Byte 0	00 to FF
58h	Expected Response Byte 1	00 to FF
59h	Expected Response Byte 3	00 to FF

The default value for the response (addresses 57h to 59h) is 000000.

2.1.31 Remaining Addresses (Addresses 5Ah to 7Fh)

These addresses are reserved for writers of custom firmware.

Appendix A Default S2000 E^{2}Prom Values

The default S2000 Configuration parameters are shown below.

Table A-1. Default EEPROM Values

Adr	Description	Value
00	Reserved	00
01	Reserved	00
02	Reserved	00
03	Reserved	00
04	Reserved	00
05	Reserved	00
06	Reserved	00
07	Reserved	00
08	Reserved	00
09	Reserved	00
0A	Reserved	00
0B	Reserved	00
0C	Reserved	00
0D	Reserved	00
0E	Reserved	00
0F	Reserved	00
10	Reserved	00
11	Reserved	00
12	Reserved	00
13	Baud rate (low byte)	DC
14	Baud rate (high byte)	FF
15	Communications Parameters	04
16	Communications Interface	00
17	Communications Protocol	01
18	Reserved	00
19	Reserved	00
1A	ASCII Protocol Read Mode	1B
1B	ASCII Protocol Control Byte	00
1C	ASCII Protocol General Purpose	00
1D	Reserved	00
1E	Reserved	00
1F	Reserved	00
20	Tiris Bus Protocol ID	01
21	TBP Inter-byte Timeout (L)	7E
22	TBP Inter-byte Timeout (H)	F6
23	Tiris Bus Protocol Read Mode	00
24	Tiris Bus Protocol Control Byte	00
25	Reserved	00
26	Reserved	00
27	Synchronization Type	01
28	Charge Period	32
29	Tag write timings (L off L)	40

Table A-1. Default EEPROM Values (continued)

Adr	Description	Value
2A	Tag write timings (L off H)	FF
2B	Tag write timings (H off L)	B8
2C	Tag write timings (H off H)	FC
2D	Tag write timings (L on L)	4E
2E	Tag write timings (L on H)	FA
2F	Tag write timings (H on L)	DA
30	Tag write timings (H on H)	FC
31	RFM Type	00
32	Synchronization Timeout (L)	00
33	Synchronization Timeout (H)	00
34	Programming charge time	0E
35	Encryption charge time	06
36	Reserved	00
37	Reserved	00
38	Duty Cycle pause (L)	00
39	Duty Cycle pause (H)	00
3A	Default MPT page	00
3B	Reserved	00
3C	Reserved	00
3D	Reserved	00
3E	I/O Port Direction	01
3F	I/O Default 1	F0
40	I/O Default 2 (not used)	00
41	Reserved	00
42	Reserved	00
43	Reserved	00
44	Reserved	00
45	Millisecond Timer (L)	84
46	Millisecond Timer (H)	FC
47	Reserved	00
48	Reserved	00
49	Reserved	00
4A	Reserved	00
4B	Multiplexer control	00
4C	Multiplexer antenna	00
4D	Reserved	00
4E	Reserved	00
4F	Reserved	00
50	DST Operation Code	40
51	DST Selective address	00
52	DST Challenge 0	00
53	DST Challenge 1	00
54	DST Challenge 2	00
55	DST Challenge 3	00
56	DST Challenge 4	00
57	DST Expected Response 0	00

Table A-1. Default EEPROM Values (continued)

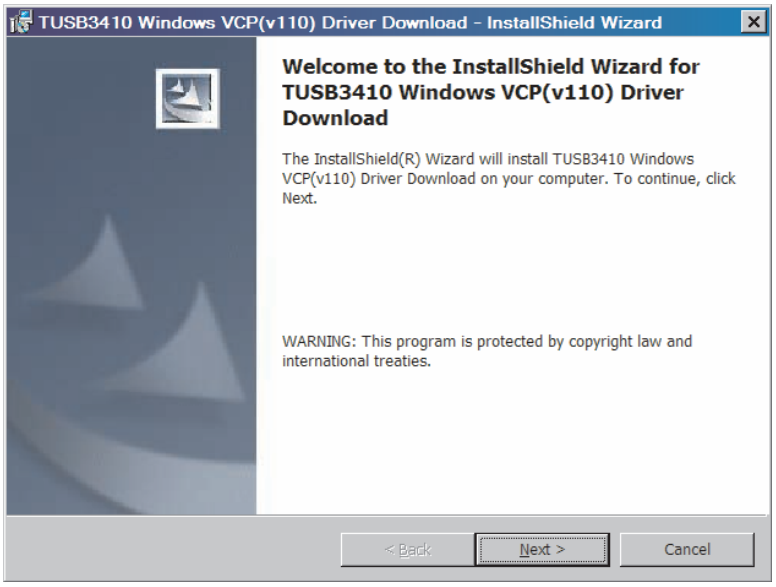
Adr	Description	Value
58	DST Expected Response 1	00
59	DST Expected Response 2	00
5A	Reserved	00
5B	Reserved	00
5C	Reserved	00
5D	Reserved	00
5E	Reserved	00
5F	Reserved	00
60	User configuration	00
61	User configuration	00
62	User configuration	00
63	User configuration	00
64	User configuration	00
65	User configuration	00
66	User configuration	00
67	User configuration	00
68	User configuration	00
69	User configuration	00
6A	User configuration	00
6B	User configuration	00
6C	User configuration	00
6D	User configuration	00
6E	User configuration	00
6F	User configuration	00
70	User configuration	00
71	User configuration	00
72	User configuration	00
73	User configuration	00
74	User configuration	00
75	User configuration	00
76	User configuration	00
77	User configuration	00
78	User configuration	00
79	User configuration	00
7A	User configuration	00
7B	User configuration	00
7C	User configuration	00
7D	User configuration	00
7E	User configuration	00
7F	User configuration	00

Appendix B Installing the USB Drivers/Software for XP

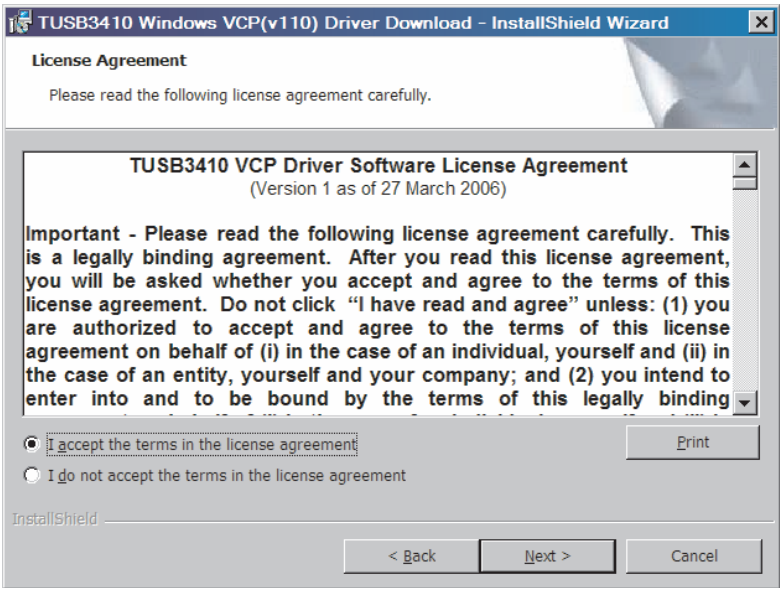
B.1 Creating the Installer Folder

Download “TUSBWINVCP_2KXP_V110.zip” (or later version) file from the TI website http://focus.ti.com/docs/prod/folders/print/tusb3410.html

Unzipping the file will create directory “...\TUSB3410 Windows VCP Driver ClipWrap Installer”. Move to subdirectory “DISK 1” and run “Setup.exe”.

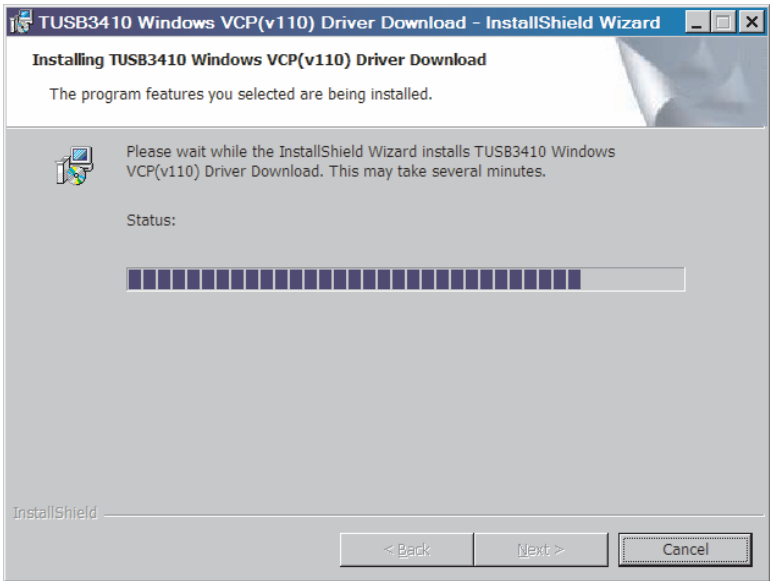


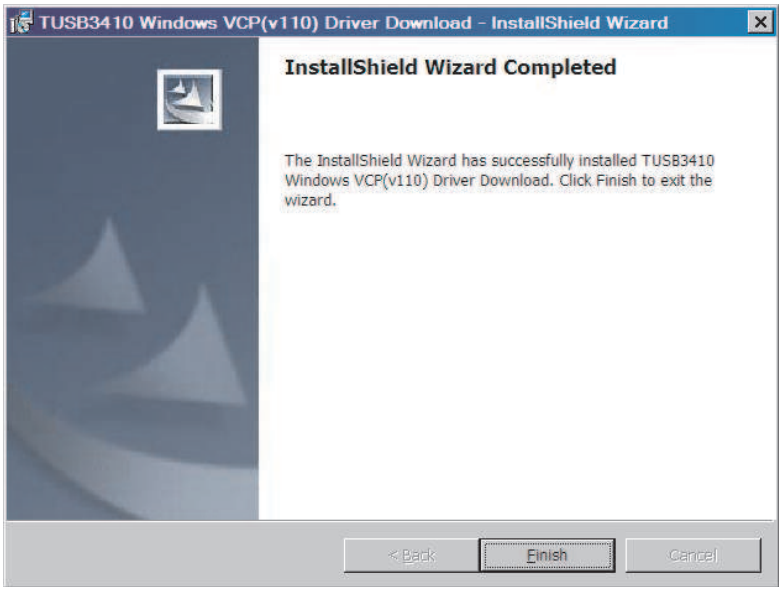
Click “Next > “ to continue.



This will display the license agreement that you must agree with to continue.

Click “Next >” to continue.

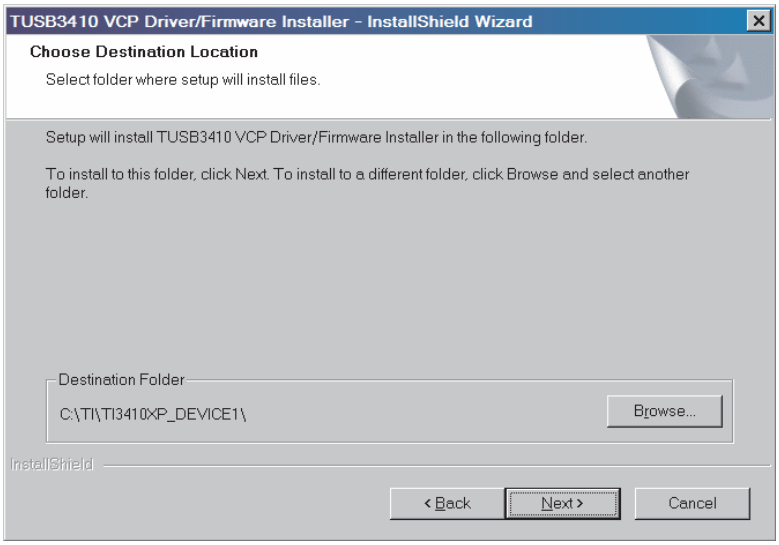




When the program completes, it will have created a directory at “Primary Volume: \Program Files\Texas Instruments\TUSB3410_VCP_v110_Installer” from where you can install the drivers.

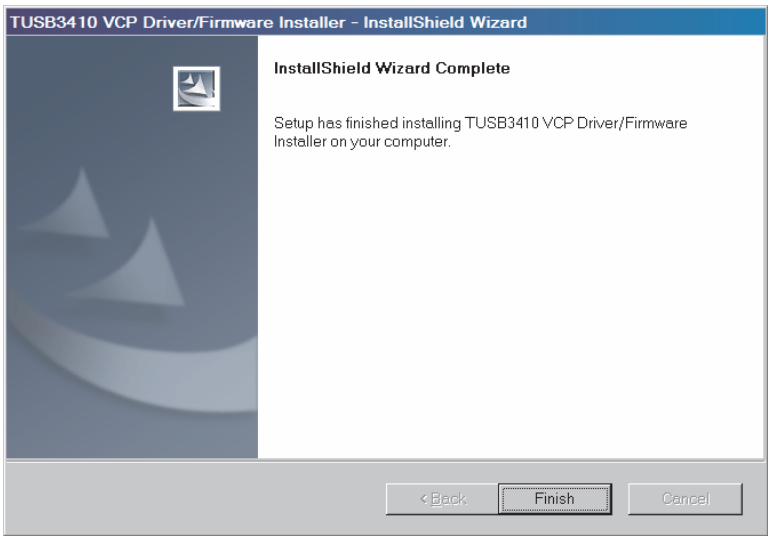
B.2 Installing the Drivers

Extract the files located in "..\Program Files\Texas Instruments\TUSB3410_VCP_v110_Installer\Disk 1.zip" to create subdirectory "..\DISK 1" and run file "setup.exe".



This will install all the necessary files in the default directory "Primary volume:\TI\TI3410XP_DEVICE1 or the destination folder chosen.

When complete you will see the following:



B.3 Connecting the Reader

You can now connect the USB cable from the S2000 to the Host Computer.

Note: Jumper J11 must be in place for USB operation.

Windows will automatically install the drivers.

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