

**ToolKit User Manual**  
**for Dual-Fuel Locomotive Control**

**for Cummins India**  
**(PCM128-HD)**



### General Precautions

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment.

Practice all plant and safety instructions and precautions.

Failure to follow instructions can cause personal injury and/or property damage.



### Revisions

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### Proper Use

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.



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**Revisions**—Changes in this publication since the last revision are indicated by a black line alongside the text.

Woodward reserves the right to update any portion of this publication at any time. Information provided by Woodward is believed to be correct and reliable. However, no responsibility is assumed by Woodward unless otherwise expressly undertaken.

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## Warnings and Notices

### Important Definitions



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

- **DANGER**—Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
- **WARNING**—Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- **CAUTION**—Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE**—Indicates a hazard that could result in property damage only (including damage to the control).
- **IMPORTANT**—Designates an operating tip or maintenance suggestion.

#### **WARNING**

**Overspeed /  
Overtemperature /  
Overpressure**

The engine, turbine, or other type of prime mover should be equipped with an overspeed shutdown device to protect against runaway or damage to the prime mover with possible personal injury, loss of life, or property damage.

The overspeed shutdown device must be totally independent of the prime mover control system. An overtemperature or overpressure shutdown device may also be needed for safety, as appropriate.

#### **WARNING**

**Personal Protective  
Equipment**

The products described in this publication may present risks that could lead to personal injury, loss of life, or property damage. Always wear the appropriate personal protective equipment (PPE) for the job at hand. Equipment that should be considered includes but is not limited to:

- Eye Protection
- Hearing Protection
- Hard Hat
- Gloves
- Safety Boots
- Respirator

Always read the proper Material Safety Data Sheet (MSDS) for any working fluid(s) and comply with recommended safety equipment.

#### **WARNING**

**Start-up**

Be prepared to make an emergency shutdown when starting the engine, turbine, or other type of prime mover, to protect against runaway or overspeed with possible personal injury, loss of life, or property damage.

#### **WARNING**

**Automotive  
Applications**

On- and off-highway Mobile Applications: Unless Woodward's control functions as the supervisory control, customer should install a system totally independent of the prime mover control system that monitors for supervisory control of engine (and takes appropriate action if supervisory control is lost) to protect against loss of engine control with possible personal injury, loss of life, or property damage.

**NOTICE****Battery Charging  
Device**

To prevent damage to a control system that uses an alternator or battery-charging device, make sure the charging device is turned off before disconnecting the battery from the system.

## Electrostatic Discharge Awareness

**NOTICE****Electrostatic  
Precautions**

Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts:

- Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control).
- Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards.
- Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices.

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual **82715**, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Follow these precautions when working with or near the control.

1. Avoid the build-up of static electricity on your body by not wearing clothing made of synthetic materials. Wear cotton or cotton-blend materials as much as possible because these do not store static electric charges as much as synthetics.
2. Do not remove the printed circuit board (PCB) from the control cabinet unless absolutely necessary. If you must remove the PCB from the control cabinet, follow these precautions:
  - Do not touch any part of the PCB except the edges.
  - Do not touch the electrical conductors, the connectors, or the components with conductive devices or with your hands.
  - When replacing a PCB, keep the new PCB in the plastic antistatic protective bag it comes in until you are ready to install it. Immediately after removing the old PCB from the control cabinet, place it in the antistatic protective bag.

# Chapter 1.

## General Information

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Two versions of ToolKit Service Tool are available for use with the PCM128-HD:

1. ToolKit Professional is a licensed software tool that enables the application engineer to modify or create new screens for service configuration. At the point of creating new screens, ToolKit Professional is used to:
  - Configure the control software to the specific site or application needs
  - Monitor and tune system variables that were selected in the GAP application program
  - Trend variables
  - Upload and download all tuneable and configuration variables from the control
2. The standard ToolKit is a software tool that does not have the capability to modify screens. Otherwise, it provides the same functionality as ToolKit Professional.

Woodward's ToolKit software may be downloaded from the Woodward website ([www.woodward.com/software/software.cfm](http://www.woodward.com/software/software.cfm)). Alternatively, a ToolKit CD Install Kit may be purchased from your Woodward distributor. Once downloaded, the kit's Setup.exe program will guide the user through the installation of ToolKit.

## Chapter 2. Using ToolKit Service Tool

### Introduction

The following is a brief list of instructions for using Woodward's ToolKit service tool to view/change the variables for your PCM128-HD control with a PC (personal computer). These instructions are meant to be introductory only. Following the brief instructions list below are more in-depth steps for using ToolKit. Full on-line help is available in each application. It is assumed that you already have ToolKit software installed and the control has a valid application running.

### PCM128-HD to PC Wiring for ToolKit Communication

Connect the PC's serial communication port to the PCM128-HD control's SCL+ (J1 B22) and SCL- (J1 B23) pins using an RS-485-to-RS-232 converter (such as B&B Electronics Model 485SD9TB, Woodward P/N 1784-1038). The SCL+ line connects to the TD (B) pin on the converter, and the SCL- line connects to the TD (A) pin on the converter. Alternatively, an RS-485-to-USB converter (such as B&B Electronics Model USOTL4, Woodward P/N 1784-1037) can be used to connect the PC's USB port to the PCM128-HD control. (Refer to the USOTL4 datasheet, available on the B&B Electronics website [[www.bb-elec.com/](http://www.bb-elec.com/)], for proper wiring and dip-switch settings for RS-485-to-USB connectivity.)

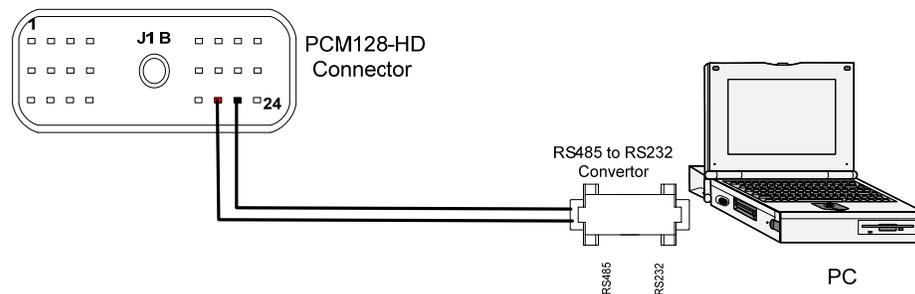
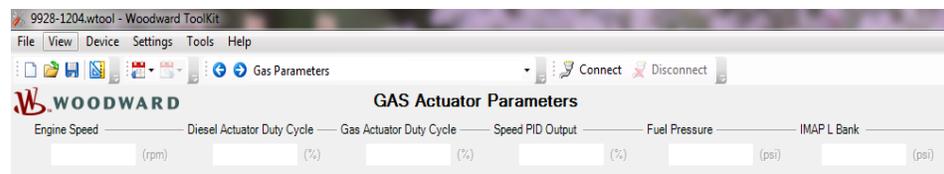


Figure: 2-1. Connecting the PCM128-HD to a PC

### Establishing Communication

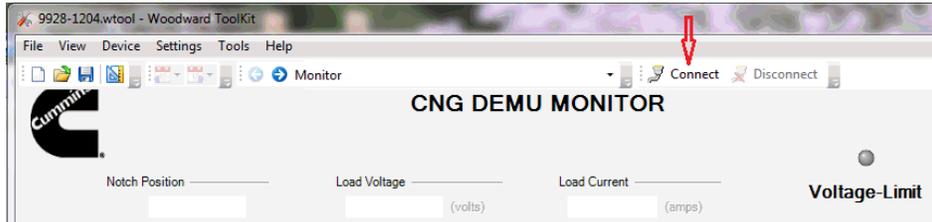
#### Step 1—Opening a ToolKit File

Before communications can begin between the ToolKit software and the PCM128-HD, a ToolKit project file should be opened. To open a ToolKit project file, select Open Tool under the File menu. ToolKit files have either a .wtool or .wprj file extension. The file browser will open in your default location for projects as configured in ToolKit Defaults. You do not need to be connected to a control to open a project file.



## Step 2—Connecting to the PCM128-HD

1. Make sure that all other programs or devices that may access your computer's communication port are shut down.
2. Select Connect from the Communication menu in ToolKit. The user must select the COM port (unless the correct port is configured as the default in the Options... dialog of the Tools menu). ToolKit automatically detects the baud rate of the control.



## Downloading the GAP Application Code

The PCM128-HD may be shipped from the factory with a default GAP program. If there is a default GAP application and a new application needs to be loaded, the download process only requires the control to be connected to the RS-485 port, via a USB-to-RS-485 or RS-232-to-RS-485 converter, and selecting the option Load Application from the File menu. This will start the Load Application Wizard.

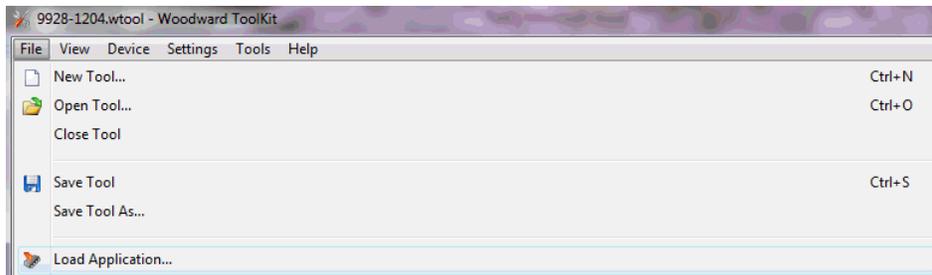


**Be sure the engine is shut down before downloading. Damage to the engine or even serious personal injury can result if the engine is running during the download procedure.**

### Personal Injury

## Download the Application File

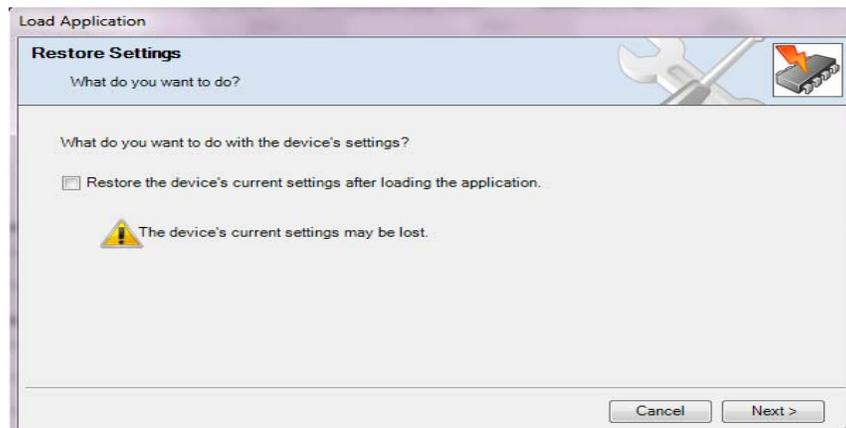
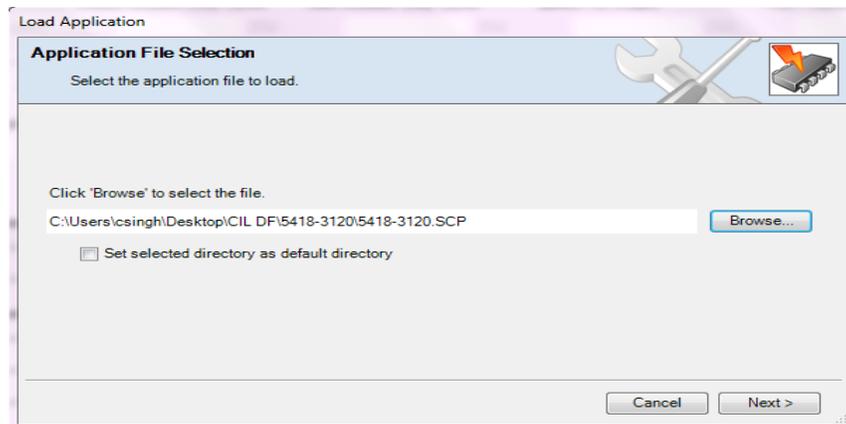
1. Select the option Load Application from the File menu.



2. A warning screen will ask that the user make sure the prime mover is shut down before downloading. When the warning screen has been addressed by clicking Next >, the application file (SCP) to load into the PCM128-HD must be selected.



3. Once the file is selected, click Next > to begin the download. The PCM128-HD will automatically reboot and start a boot loader to accept the new program.



After the new connection is established (automatically), the new application download will begin. A progress meter indicates the download status.

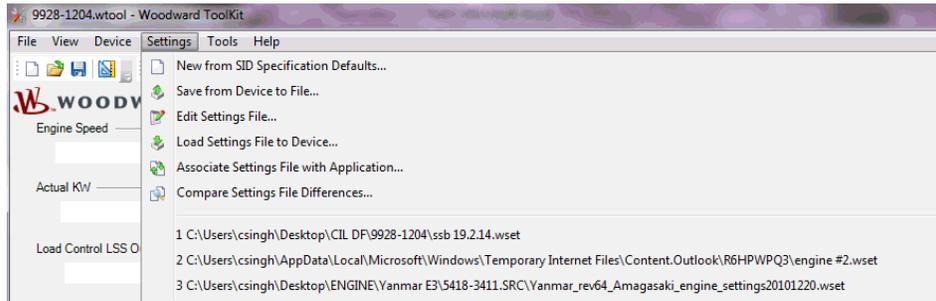
The download process should not be interrupted or cancelled. If it is, there may not be a valid application in the PCM128-HD. Another attempt to download may be possible, but in the event that the previous application has been erased, the only means to re-program the control is by using the special hard-boot mode harness configuration detailed earlier in this section.

4. When downloading is complete, the control will reboot automatically. When the reboot is completed, the control will begin execution of the new application program.
5. After downloading an application, the user may desire to reload the application settings (if applicable). See the Settings section for instructions.

## Settings Files

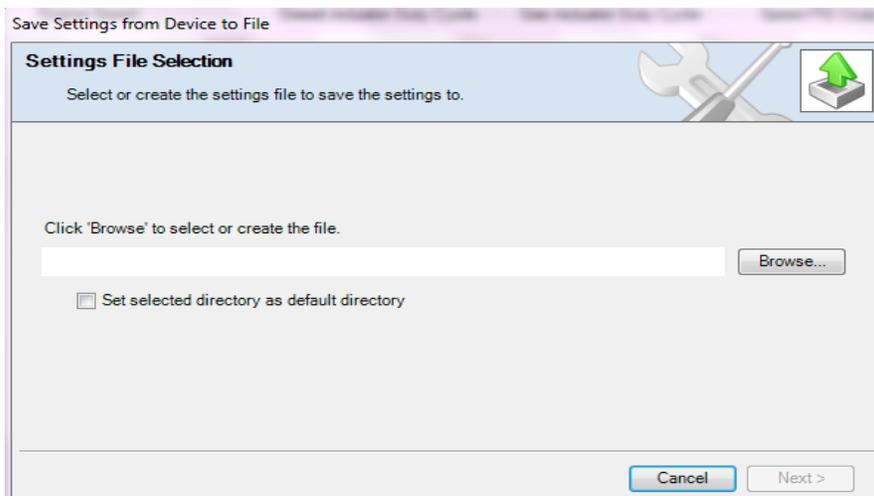
This section discusses how to work with Settings Files in ToolKit. Settings Files that are saved offline can be viewed offline and can be edited offline.

To work with settings files, select Settings menu.

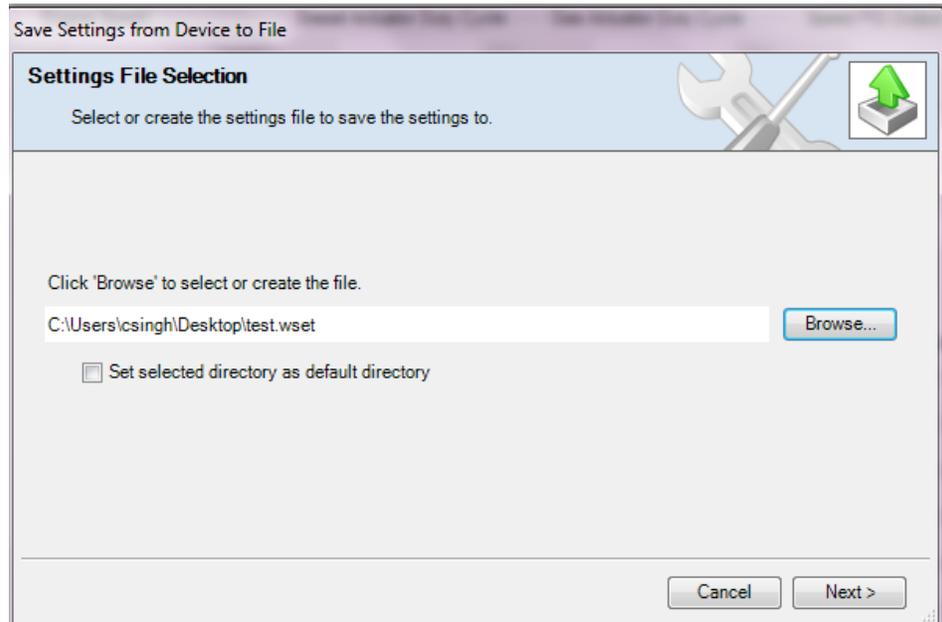


### Saving Settings Files from control (PCM128-HD)

To save the current Settings File from the control, the tool must be connected to the control to use this option. If no connection is present, an error window will be displayed. If a connection is present, a Save Settings Wizard will appear.

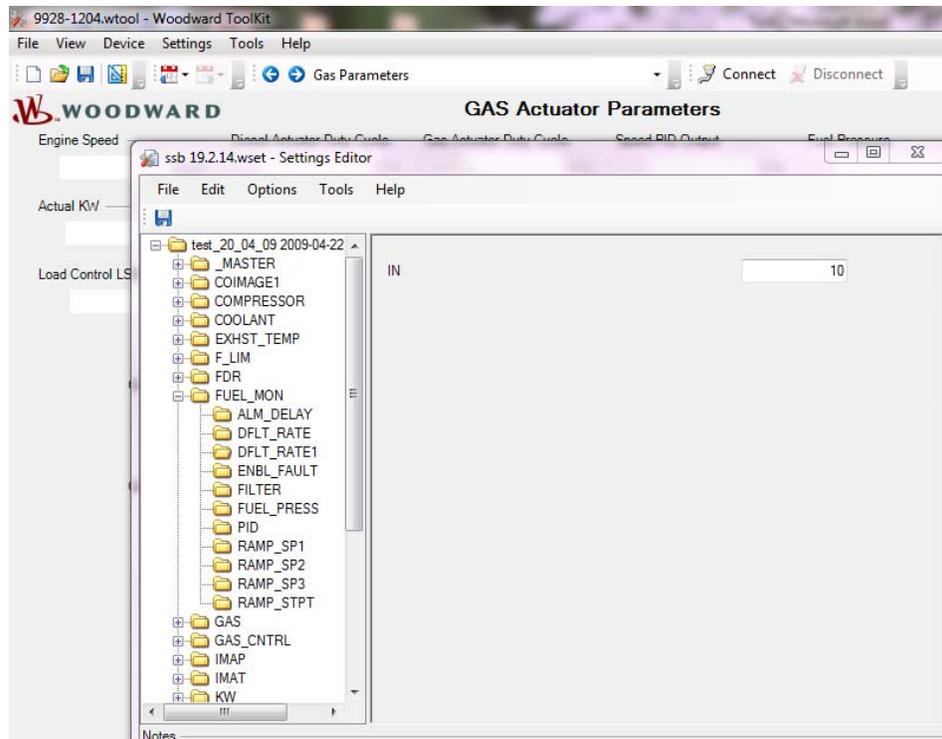


To save the settings, first browse for the directory and file name (if you want a new file name, simply type it in) in which to save the settings. Then select Next >. Then the control will initialize and upload (save) the settings.



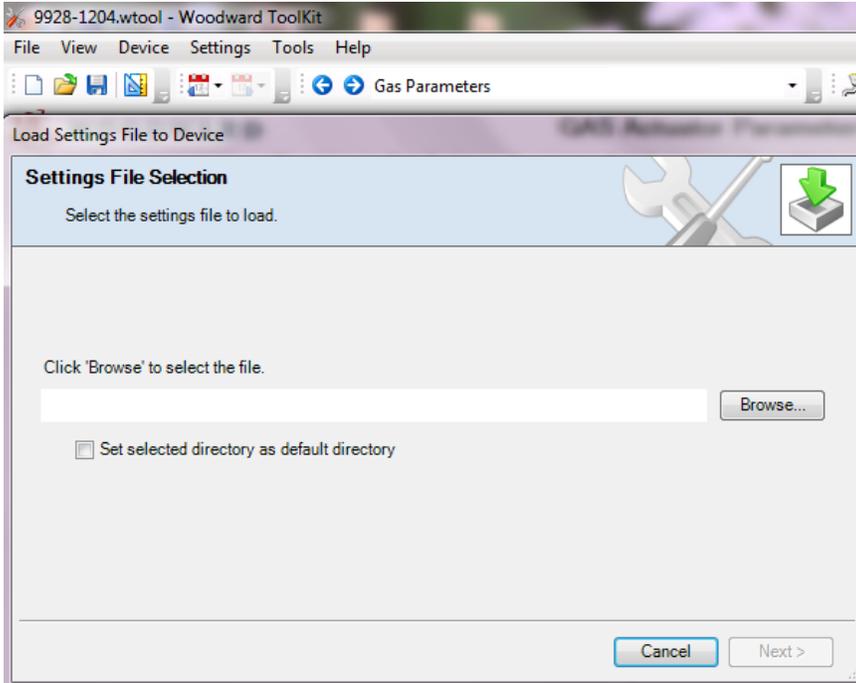
### View/Edit a Settings File

If a settings file is already present, it can be viewed and edited offline. Go to the 'Settings' menu and click on 'Edit Setting File'. The file will have a .wset extension.

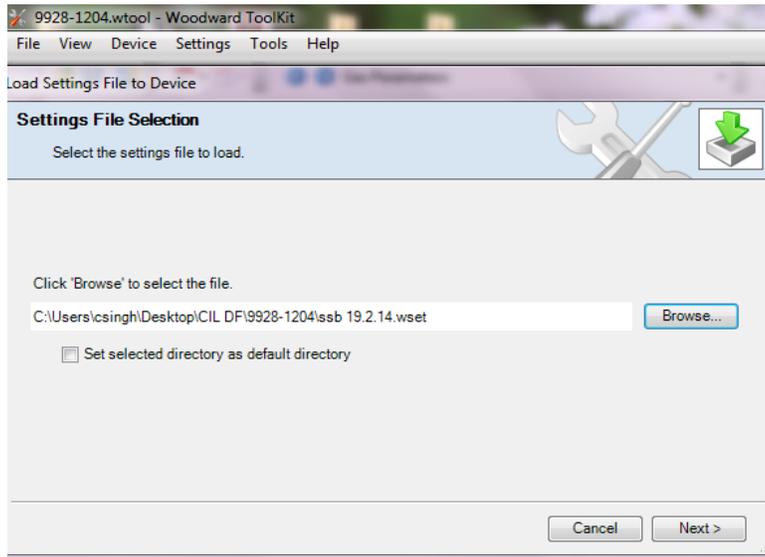


### Loading Settings into the Control (PCM128-HD)

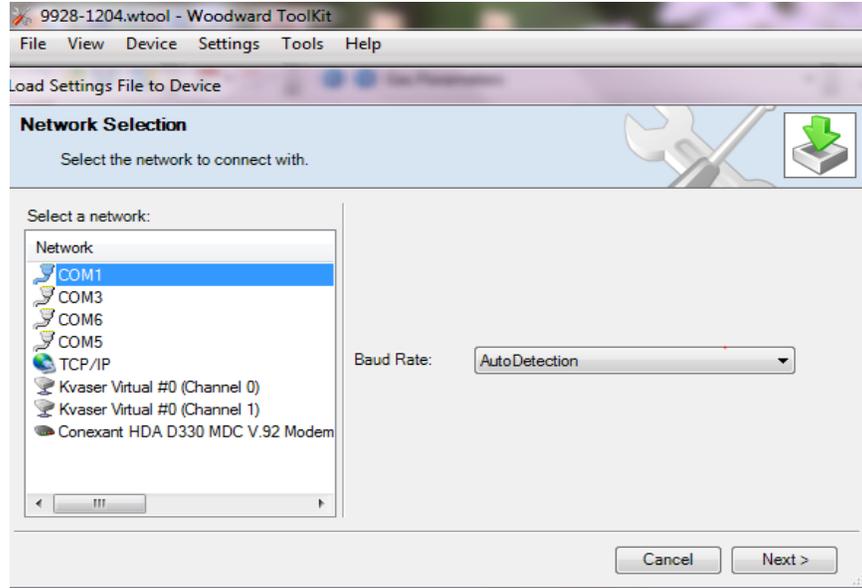
If a settings file is present and you want to load it to the control (PCM128-HD), the tool must be connected to the control to use this option. If no connection is present, an error window will be displayed. If a connection is present, a Save Settings Wizard will appear. Go to the 'Settings' menu and click on 'Load Settings File to Device'. It will ask for the location of the settings file saved in the PC.



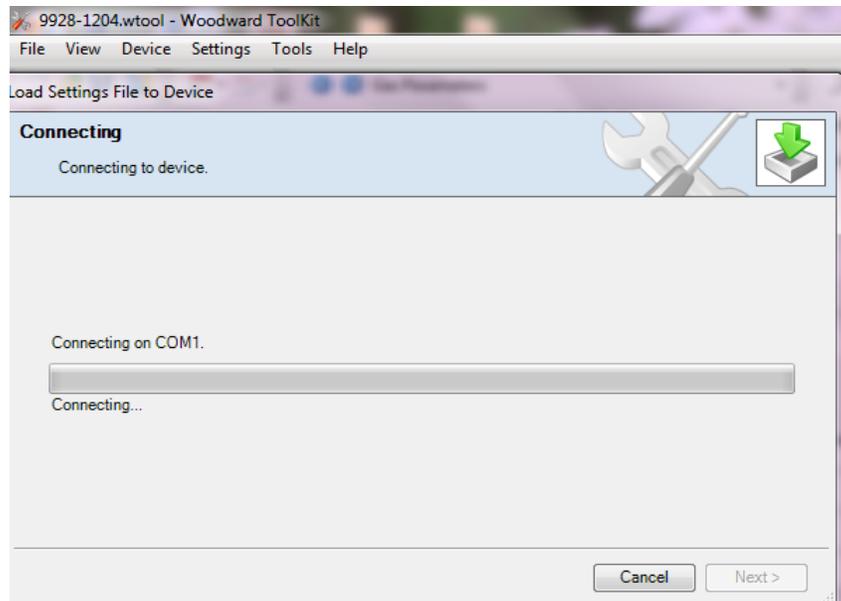
Select the appropriate file and click on the 'Next >' button.



Select network 'COM1' and baud rate 'auto detection' and click on Next >.



It will load the settings file into the control.



## Chapter 3. Troubleshooting

### Introduction

The following troubleshooting guide is an aid in isolating trouble to the ToolKit and PC communication.

SYMPTOM	CAUSE	REMEDY
Communication is not established between control and PC	1. Control is not powered on.	Check the control & ensure that control is powered ON.
	2. Communication wires open/broken.	Check wiring on both ends.
	3. RS 485 to RS-232 convertor is faulty.	Replace the convertor.

### How to Contact Woodward

For assistance, call one of the following Woodward facilities to obtain the address and phone number of the facility nearest your location where you will be able to get information and service.

<u>Facility</u>	<u>Phone Number</u>
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
Germany	+49 (711) 78954-510
India	+91 (129) 4097100
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
The Netherlands	+31 (23) 5661111
United States	+1 (970) 482-5811

You can also locate your nearest Woodward distributor or service facility on our website at:

[www.woodward.com/directory](http://www.woodward.com/directory)

We appreciate your comments about the content of our publications.

Send comments to: [icinfo@woodward.com](mailto:icinfo@woodward.com)

Please reference publication **51498**.



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