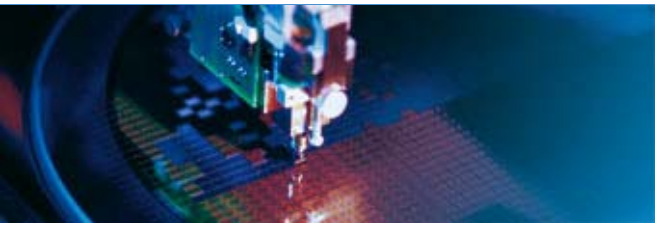

DuraNAV PCN-1001

DATA COLLECTION SOFTWARE MANUAL

Rev. 1.0 - January 2009 - ETH_DuraNAV_PCN-1001_DCSM1.0

DIGITAL TECHNOLOGIES FOR A BETTER WORLD

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- Because of the substances present in the equipment, improper use or disposal of the refuse can cause damage to human health and to the environment
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- Contact your local waste collection body for more detailed recycling information
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This device, including all it components, subassemblies and the consumable materials that are an integral part of the product, has been manufactured in compliance with the European directive 2002/95/EC known as the RoHS directive (Restrictions on the use of certain Hazardous Substances). This directive targets the reduction of certain hazardous substances previously used in electrical and electronic equipment (EEE).

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Introduction

Conventions used within this Manual

The following conventions are used throughout this manual.

Warnings and Important Notices:

Within this manual you will find the following tables, please ensure that you read and understand these as they are intended to highlight potential risks or precautions that should be taken.

Warnings:

Warnings icons precede potentially dangerous procedures (potential personal injury or damage to a system, device, or program) throughout this manual. Instructions contained in the warnings must be followed. You should also use all other safety precautions, which you deem necessary for the operation of the equipment in your operating environment.

Information and/or Notes:

Indicates important features or instructions that should be observed

Technical Assistance

If you have a technical question or if you cannot isolate a problem with your device, please send an e-mail to the Eurotech Technical Support Team at: techsupp@eurotech.com

Before returning any Eurotech supplied product, for any reason whatsoever, you must first send and e-mail to the Technical Support Team at the above email address, providing information listed below. After this you will receive an RMA number (Returned Material Authorization) for the return of the material:

Information to be provided in RMA request:

- Model number
- Serial number
- Detailed fault description
- Company Details
- Contact details

Pack the product in anti-static material and ship it in a sturdy cardboard box with enough packing material to adequately protect the shipment.
Any product returned to Eurotech improperly packed will immediately void the warranty for that particular product!

Table of Contents

Chapter 1 Data_Collection SW Description

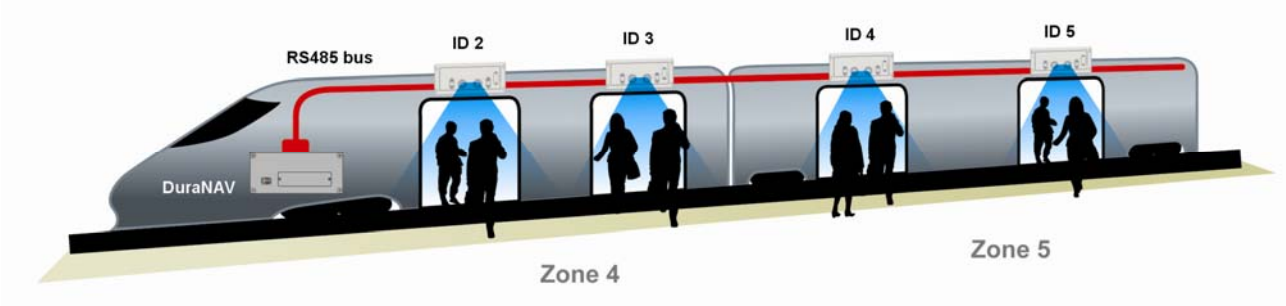
The Data_Collection Software collects the counter parameters of various PCN-1001 systems installed into a bus according to some rules contained within a configuration file, as defined by the user, that describe the topology of the bus, train or a metro obtaining a log of the counted person for statistics analysis.

Appendix A lists all the required files contained within the package.

Architecture example

The following image represents a possible configuration; it has a DuraNAV used for as the Data_Collection unit and four PCN-1001-00 counters connected via the RS485 bus.

Note: The remainder of this document will refer to this architecture.



In this case, the train is divided in two separated zones (that are located within two separate carriages), in our example we use two zones:

- Zone 4
- Zone 5

Each zone contains two doors not wider than 120 cm, each with a PCN-1001-00 installed.
Considering the PCN-1001-00 counters are connected to the DuraNAV, each device has to be programmed with an individual RS485 ID number to prevent conflicts. The following table shows the RS485 bus topology:

Device	Zone	RS485 ID
DuraNAV	--	1
PCN-1001-00	4	2
PCN-1001-00	4	3
PCN-1001-00	5	4
PCN-1001-00	5	5

Configuration Files

To describe the architecture of the system where the DuraNAV and PCN-1001 networks are installed some configuration files are provided.

This brief paragraph will describe how to edit the files according to the architecture used. As an example we consider the previous architecture as the reference for the parameters used.

The files you need to configure are as follows:

1. **parameters.txt**
2. **sys_topology.txt**

Parameters.txt

This file contains the following information:

```
serial_id 0x01
serial_br 0x1002
serial_db 0x30
serial_pr 0x0
serial_sb 0x0
timer_data 0x0
```

The program contains an info file that describes the parameters.txt configuration and is called info_parameters.txt. The contents of that file are listed below and describe the parameters you need to edit.

```
//*************************************************************************
"parameters.txt file information"
//*************************************************************************

serial_id
 System ID
 Default value 0x01. Value must be in hex format.
serial_br
 BaudeRate 0xD=B9600, 0xE=B19200, 0xF=B38400, 0x1001=B57600, 0x1002=B115200,
0x1003=B230400, 0x1004=B460800, 0x1007=B921600
 Default value 0x1002
serial_db
 Data Bits 0x30=8 bits
 Default value 0x30
serial_pr
 Parity 0x0=none, 0x200=odd, 0x100=even
 Default value 0x0
serial_sb
 Stop bit 0x0=one bit, 0x40=two bits
 Default value 0x0
timer_data
 Timer for send get counters message(in sec.).  Value must be in hex format.
 Default value 0x3=3 sec

//*************************************************************************
"parameters.txt example file"
//*************************************************************************

serial_id 0x01
serial_br 0x1002
serial_db 0x30
serial_pr 0x0
serial_sb 0x0
timer_data 0x3
```

The file refers to the serial communication settings used in the DuraNAV to communicate with the RS-485 devices. The serial port of the DuraNAV configured to operate in RS485 is Serial Port 2, the Linux O.S. refers to that serial port using the /dev/ttyZ3.

serial_id

```
System ID
Default value 0x01. Value must be in hex format.
```

This is the RS485 ID number for the DuraNAV; usually considering it operates as a master RS485 device its address is assigned as 0x01.

serial_br

```
BaudeRate 0xD=B9600, 0xE=B19200, 0xF=B38400, 0x1001=B57600, 0x1002=B115200,
0x1003=B230400, 0x1004=B460800, 0x1007=B921600
 Default value 0x1002
```

This is the baud rate used for the RS485 communication. Each PCN-1001-00 has to be configured individually to operate at this baud rate. By default the baud rate is configured as 115200.

The table below describes the other possible configuration settings:

Baud rate	serial_br
9600	0xD
19200	0xE
38400	0xF
57600	0x1001
115200	0x1002
230400	0x1003
460800	0x1004
921600	0x1007

Warning:
Considering the DuraNAV serial port is based on a ST16C554 serial chipset controller, interfaced with a physical MAX483 chipsets the maximum available baud rate is 250 Kbps. For this reason when you have to configure the serial_br in conjunction with an DuraNAV the maximum baud rate is 230400 bps.

serial_db

```
serial_db
 Data Bits 0x30=8 bits
 Default value 0x30
```

The data bits used in the RS485 serial transmissions; each PCN-1001-00 has to be configured individually to operate with the same data bit length, by default the data bits are configured as 8.

serial_pr

```
serial_pr
 Parity 0x0=none, 0x200=odd, 0x100=even
 Default value 0x0
```

The parity control used in the RS485 serial transmissions; each PCN-1001-00 has to be configured individually to operate with the same parity control. The following table lists the possible values

Parity	serial_pr
None	0x0
Odd	0x200
Even	0X100

By default the serial_pr is configured as none.

serial_sb

```
serial_sb
 Stop bit 0x0=one bit, 0x40=two bits
 Default value 0x0
```

The stop bits used in the RS485 serial transmissions; each PCN-1001-00 has to be configured individually to operate with the same stop bit length.

Parity	serial_sb
ONE	0x0
TWO	0x40

By default the stop bit is set to zero.

timer_data

```
timer_data
 Timer for send get counters message(in sec.).  Value must be in hex format.
 Default value 0x3=3 sec
```

The timer data is the time between each command sent from the DuraNAV to the PCN-1001-00 devices connected to the RS485 network to read information on door status or counters.
It is important to highlight that the Log file is written each time an event occurs on the PCN-1001 counter.

By default this counter is set to 3 seconds.

Note that an event is considered valid only when the doors are open.

sys_topology.txt

This file contains the following information and defines the logic and topology of the PCN-1001-00 network, as customer prefers.

```
zone 4
sys_number 2
IDs 2 3
log_filename1 /var/user/Zone_4_PCN1001.txt
log_filename2 /var/user/Log_Zone_4_PCN1001.txt
zone 5
sys_number 2
IDs 4 5
log_filename1 /var/user/Zone_5_PCN1001.txt
log_filename2 /var/user/Log_Zone_5_PCN1001.txt
```

The sys_topology.txt file is quite easy to understand. The file contains the definition of the two zones described in the previously, each zone lists the RS485 ID numbers of each PCN-1001-00 device. Then the names of the log files for each zone are listed.

There are two log files defined for each zone:

- log_filename1
- log_filename2

The name of the file is composed with the following rules:

- Zone_4_PCN1001.txt
- Log_Zone_4_PCN1001.txt

In case no Log file information is edited the Software will automatically generate the Log files assigning the proper Zone number in the file name.

log_filename1

```
log_filename1 /var/user/Zone_4_PCN1001.txt
```

This is a brief example of the log file:

```
Zone 4: Stop  01/01/1970 00:05:04 000094 000096
Zone 4: Start 01/01/1970 00:17:41 000094 000096
```

The file may be interpreted as follows:

- Each line contains information about an event; the events may be:
  - Start: one or more of the doors in that zone has opened
  - Stop: all the doors in that zone are closed
- The lines composed as follows:

```
Zone 4: Stop 01/01/1970 00:05:04 000094 000096
```

  - Zone XX: the zone according to the system topology configuration file
  - Start/Stop: the type of event that generated the event
  - dd/mm/yyyy: the date of the event *
  - hh:mm:ss: the time of the event *
  - XXXXXX: the entered counter information
  - XXXXXX: the exited counter information

* The Time and date information is retrieved from the PCN-1001 with the lowest ID number

log_filename2

```
log_filename2 /var/user/Log_Zone_4_PCN1001.txt
```

This is a brief example of the log file:

```
Sys.ID 2: 01/01/1970 00:01:09 000075 000082
Sys.ID 3: 01/01/1970 00:01:09 000012 000005
Sys.ID 2: 01/01/1970 00:01:11 000075 000083
Sys.ID 3: 01/01/1970 00:01:11 000012 000005
```

The log_filename2 file contains the counter information for each of the PCN-1001-00 counters that make up the Zone, as defined in the sys_topology.txt file. In this way users can analyze passenger activities more deeply.

log_filename1 contains a summary of the counts for each Zone summing each of the PCN-1001-00 contributions. Starting from log_filename2 contents you can realize the log_filename1 contents.

It is important to note that count activity is only valid when the PCN-1001-00 verifies the door status reading of the GPIXX digital input properly programmed for Enable/Disable counting.

To prevent confusion we recommend disabling the Enable/Disable counting functionality on the PCN-1001-00 devices.

The log file is written every time at least one system counts a person, and at this time all the information related to the passenger counters installed in that zone are stored.

Running the Data_Collection SW

The Eurotech DuraNAV Linux distribution runs the software automatically at boot time. The autorun script is located at /var/autorn ans has been updated to include the Software to run.

The Digital Output 1 of the DuraNAV is used to signal when the Linux distribution has completed the execution and the Data_Collection software has started working.

The Data_Collection program is located at the following path /var/user and to run it, in case it has not already been executed, you will need to type the following command:

```
-sh-3.00#./var/user/data_collection
```

When the program starts, it will display the following screenshot:

```
Zone: 4 IDs: 2 3
Zone: 5 IDs: 4 5
Sys. ID: 2 -> Door Open
Sys. ID: 3 -> Door Open
Sys. ID: 4 -> Door Open
Sys. ID: 5 -> Door Open
*************************************************************************
********* Data collection menu (imgserver version 1.2.0 or higher)*******
*************************************************************************
**      r) Reset counters                                              **
**      d) Delete all the log files                                    **
**      c) Close door (c + system ID)                                  **
**      o) Open door (o + system ID)                                   **
**      u) Update door status in menu                                  **
**      e) Exit program                                                **
```

Data_Collection SW commands

There are some basics commands that the user can operate as described below:

r) Reset counters

Sends a broadcast reset counter command to all the PCN-1001-00 counters connected.

d) Delete all the log files

Erases the contents of the following log files: log_filename1 and log_filename2.

c) Close door (c + system ID)

Forces the door status of a specific system to “Closed”. In this case the PCN-1001-00 counting functionality is disabled. The door control can be used on the systems with the RS485 ID different from 2,3,4,5 because in this case the information is read using the digital IO of the DuraNAV.

o) Open door (o + system ID)

Forces the door status of a specific system to “Open”. In this status the PCN-1001-00 counting functionality is enabled. The door control can be used on the systems with the RS485 ID different from 2,3,4,5 because in this case the information is read using the digital IO of the DuraNAV.

u) Update door status in menu

Sends a broadcast message to update the door status of the PCN-1001-00 systems.

e) Exit program

Exits the program.

Data_Collection Software functionality

The software operates by reading the counters attached to the RS485 attached devices as described in the sys_topology.txt file.

The counting activity is enabled when the doors are opened. The Door status can be transmitted to the DuraNAV in two different ways:

- Reading the door status remotely from each PCN-1001-00 connected to the RS485 network according to the topology; in this case users have to enable the GPI1 Enable/Disable counting on the Passenger counter.
- Reading the DuraNAV Digital IO status; in this case it will be better if you disable the GPI1 on the PCN-1001-00 to allow the Digital Inputs of the DuraNAV to enable counters.

In case you use the DuraNAV Digital IO status the functionality of reading the remote door status via RS485 is disabled; the correspondences between DuraNAV Digital Input and PCN-1001-00 doors are listed below:

Digital Input	PCN-1001-00 reference	Linux reference
Digital Input 1	ID 2 (If present)	/proc/sys/dev/duranav/gpio/in_1
Digital Input 2	ID 3 (If present)	/proc/sys/dev/duranav/gpio/in_2
Digital Input 3	ID 4 (If present)	/proc/sys/dev/duranav/gpio/in_3
Digital Input 4	ID 5 (If present)	/proc/sys/dev/duranav/gpio/in_4

The status of the PCN-1001-00 is summarized in the following table:

Digital Input	Door Status	PCN-1001-00 count
0	Closed	Disabled
1	Opened	Enabled

It is better to use the DuraNAV Digital IO inputs to control the door status as this simplifies the cabling of the PCN-1001-00 units over each door and it takes the door open/close status from a central unit where it is supposed the DuraNAV unit is installed.

From a functional point of view the PCN-1001-00 GPIO used for door control, works on a toggle so the first time the system boots it is unable to know the door status till a transition is made; the DuraNAV Digital IO can recognize the status of the lines managing properly the PCN-1001-00 counting.

The time and date information is read directly from the PCN-1001-00 with the lower RS485 ID connected to the RS485 network. In the previous examples it is read from the PCN-1001-00 with ID 2.

Warning:
It is important to ensure that the PCN-1001-00 that acts as the time and date reference is programmed with the correct information. In case of power loss the Real-Time-Clock is updated because an internal Super-Cap backup the powers and guarantees about 57 days of backup.

Downloading the Log files from the DuraNAV

As already discussed the Data_Collection software stores PCN-1001-00 information in the log files, as described previously, on the Disk-On-Module installed within the DuraNAV.

Considering DuraNAV gives network connectivity over Ethernet or WiFi[1] it is possible to access via Linux ssh or FTP the O.S. transferring the Log files located under /var/user/.

The account information to use is:

Username	Password
root	root

After the user has transferred the log files it is possible to manipulate the information by importing it into a spreadsheet such as Excel.

[1] To configure the Ethernet or WiFi connectivity we recommend that you to refer to the DuraNAV Software Manual that have the steps to configure the network according to user requirements.

Appendix A

Files required

File	Description	File system location
Data_Collection	Application program	/var/user/
info_parameters.txt	Help File	/var/user/
info_sys_topology.txt	Help File	/var/user
parameters.txt	RS485 Configuration File	/var/user/
sys_topology.txt	System Configuration File	/var/user/

Configuration files

The DuraNAV ***eld*** configuration is contained in the `/etc/sysconfig` directory and is organized in two main categories:

- **info_parameters.txt**

```
serial_id
 System ID
 Default value 0x01. Value must be in hex format.
serial_br
 BaudeRate 0xD=B9600, 0xE=B19200, 0xF=B38400, 0x1001=B57600,
0x1002=B115200, 0x1003=B230400, 0x1004=B460800, 0x1007=B921600
 Default value 0x1002
serial_db
 Data Bits 0x30=8 bits
 Default value 0x30
serial_pr
 Parity 0x0=none, 0x200=odd, 0x100=even
 Default value 0x0
serial_sb
 Stop bit 0x0=one bit, 0x40=two bits
 Default value 0x0
timer_data
 Timer for send get counters message(in sec.).  Value must be in hex
format.
 Default value 0x3=3 sec

//*************************************************************************
*
"parameters.txt example file"
//*************************************************************************
*

serial_id 0x01
serial_br 0x1002
serial_db 0x30
serial_pr 0x0
serial_sb 0x0
timer_data 0x3
```

- **info_sys_topology.txt**

```
serial_id
 System ID
 Default value 0x01. Value must be in hex format.
serial_br
 BaudeRate 0xD=B9600, 0xE=B19200, 0xF=B38400, 0x1001=B57600,
0x1002=B115200, 0x1003=B230400, 0x1004=B460800, 0x1007=B921600
 Default value 0x1002
serial_db
 Data Bits 0x30=8 bits
 Default value 0x30
serial_pr
 Parity 0x0=none, 0x200=odd, 0x100=even
 Default value 0x0
serial_sb
 Stop bit 0x0=one bit, 0x40=two bits
 Default value 0x0
timer_data
 Timer for send get counters message(in sec.).  Value must be in hex
format.
 Default value 0x3=3 sec

//*************************************************************************
*
"parameters.txt example file"
//*************************************************************************
*

serial_id 0x01
serial_br 0x1002
serial_db 0x30
serial_pr 0x0
serial_sb 0x0
timer_data 0x3
```

DuraNAV firmware upgrade

As listed in the DuraNAV Software Manual, there is a procedure that allows users to restore the O.S. contents. For the specific application SW we have realized a USB pen that allows users to completely restore the software into the DuraNAV.

Warning:
A power loss during the firmware writing operation can be very dangerous and may compromise the firmware image

command because the phone-book is unchanged.

Since the phone-book is loaded from the modem only when system is powered-on, after any change to the phone-book entries the system must be switched off and then switched on again in order for the changes to take effect.

Note:
Wait for about 30 seconds before switching on again

Revision History

REVISION	DESCRIPTION	DATE
1.0	First release	January 2009

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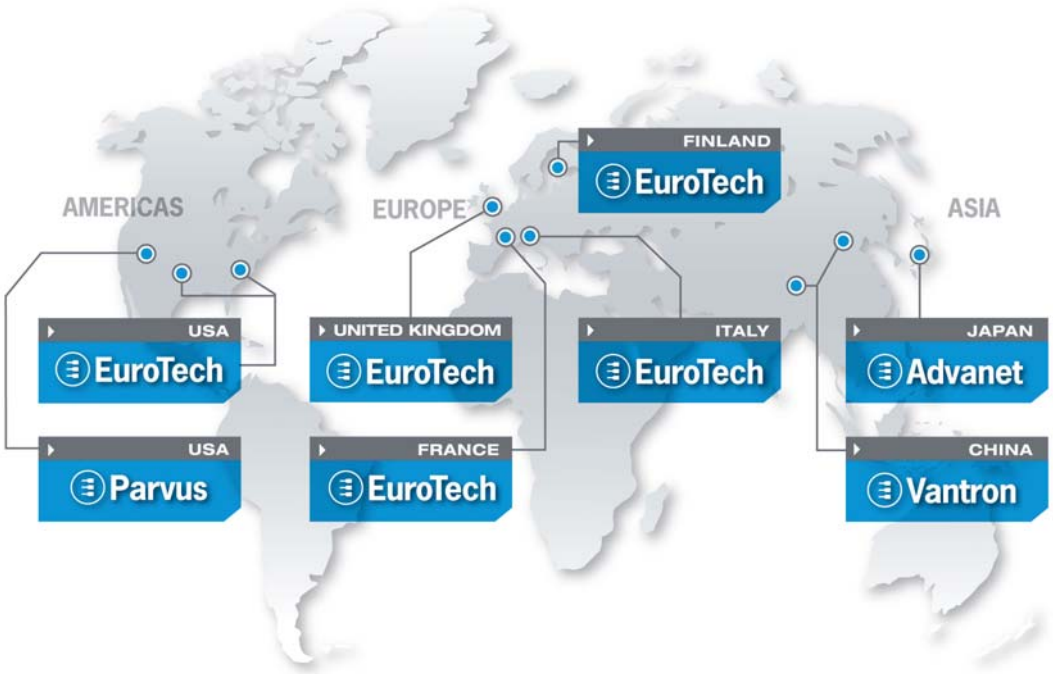

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