# **METTLER TOLEDO**

DNB00001000 User Manual



## Preface

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Your feedback is important to us! If you have a problem with this product, or just a suggestion on how we can serve you better, please fill out this form and send it to us. If you are in the United States, you can mail this postpaid form to the address on the reverse, or fax it to (614) 438-4355. If you are outside the United States, please apply the appropriate amount of postage before mailing. You can also send your feedback via email to: <u>quality\_feedback.mtwt@mt.com</u>.

Your Name:	Date:
Organization Name:	METTLER TOLEDO Order Number
Address:	Part / Product Name:
	Part / Model Number:
	Serial Number:
Phone Number: ( ) Fax Number: ( )	Company Name for Installation:
E-mail Address:	Contact Name:
	Phone Number:

How well did	this product meet your	Comments:
expectations i	n its intended use?	
Met and	exceeded my needs	
Met all n	needs	
Met mos	st needs	
Met som	ne needs	
Did not i	meet mv needs	

PROBLEM: UNACCEPTABLE DELIVERY:	out of Box Error:			
Shipped late Shipped early Shipped to incorrect location Other (Please Specify) Comments/Questions:	Wrong itemWrong documerWrong partMissing documerMissing equipmentIncorrectly calibridEquipment failureOther (Please spectrum)			
DO NOT WRITE IN SPACE BELOW; FOR METTLER TOLEDO USE ONLY				

Retail	Light Industrial	Heavy Industrial	Systems
RESPONSE: Include Ro	oot Cause Analysis and Corrective A	ction Taken.	

FOLD THIS FLAP FIRST



Please seal with tape.

## SAFETY NOTICE



Product safety is a fundamental concern at METTLER TOLEDO. Use common sense and follow the simple precautions listed below to ensure your safety and optimize the use and performance of this product.

- Read this manual before operating or servicing this product. Save this manual for future reference.
- Observe safety warnings located throughout this manual.
- Use caution when lifting or moving heavy equipment.
- Never immerse electronic products in liquids.
- This product should be serviced by qualified personnel. Exercise care when moving, testing, or adjusting this product.
- Disconnect all power to this product before installing, servicing, or cleaning.
- Use only METTLER TOLEDO parts for repair.
- Observe electrostatic handling precautions for electronic components. Allow at least 30 seconds after power disconnection to allow charges to dissipate before servicing any electronic components.
- Allow the product to stabilize at ambient room temperature before applying power.

## FAILURE TO FOLLOW THESE PRECAUTIONS COULD RESULT IN DAMAGE TO EQUIPMENT AND/OR BODILY HARM.

Features	Benefits		
DeviceNet Node Profile	Slave device		
DeviceNet Cabling	Terminal block configuration supports twisted pair trunkline-dropline configuration with signal and 24 VDC power in same cable		
DeviceNet Addressing	Supports MAC addresses 0-63		
DeviceNet Baud Rate	Selectable baud rates of 125k, 250k, and 500k maximum		
DeviceNet Services	Supports polled messaging with four defined assemblies		
DeviceNet Data	Provides a single precision floating point number (displayed weight, displayed tare, recorded weight, recorded tare) and scale status bits (motion, gross/net, over capacity, below zero, communication error)		
DeviceNet EDS File	Full EDS file support for METTLER TOLEDO profile		
Serial Protocol	Supports terminals configured with the "METTLER TOLEDO Continuous" protocol with optional "CTPZ" (including JAGXTREME, JAGUAR, LYNX, PANTHER, PANTHER PLUS, PUMA, and COUGAR terminals and the SPEEDWEIGH/SPEEDWEIGH PLUS and TRIMWEIGH II scales)		
Serial Interface	Supports RS232 only		
Serial Baud Rate	Supports autobaud ranging from 1200 to 19.2K baud		
Serial Cable	1 meter cable included		
<b>P</b> I	Compatible with older METTLER TOLEDO scale terminals (such as 8510, 8530, 8146, 8142, and 8140)		
Flexibility	Small and compact		
	Quick disconnects and easy setup for field replacement in minutes		



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5.2 6. DAT/ 6.1 6.2 6.3 6.4 7. OPE 7.1 7.2 7.3 7.3.	SETTING UP AN I/O CONNECTION A FORMAT CONTINUOUS MODE OUTPUT OUTPUT ASSEMBLY INPUT ASSEMBLY INPUT ASSEMBLY INTERNAL ADAPTER REGISTERS RATION INITIAL CONDITIONS AUTOBAUD MODE NORMAL MODE 1 DPRAM IN Area	
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## 1. Terminology / Definitions

Term	Definition
MSB	Most Significant Byte
LSB	Least Significant Byte
MSD	Most Significant Digit
LSD	Least Significant Digit
NAN	IEEE Not a Number, defined as 0xFF, 0xFF, 0xFF, 0xFF
DPRAM	Dual Port Random Access Memory
RAM	Random Access Memory
ROM	Read Only Memory
LED	Light Emitting Diode
byte	8-bit value
word	16-bit value
dword	32-bit value
big endian format	The most significant byte is stored in the lowest memory address.
little endian format	The most significant byte is stored in the highest memory address. Bytes
	at lower addresses have lower significance.
EDS	Electronic Data Sheet

## 2. Introduction

The METTLER TOLEDO DNB00001000 (DeviceNet bridge) allows sharing of weight measurements from a METTLER TOLEDO scale terminal via the continuous mode output to a DeviceNet network.



Figure 1 DeviceNet Network with METTLER TOLEDO DNB00001000 DeviceNet Bridges

#### 3. System Overview

#### 3.1 DeviceNet Characteristics

- DeviceNet specific cable (twisted pair)
- Access to intelligence present in low-level devices Master/Slave and Peer-to-Peer capabilities
- Trunkline-dropline configuration
- Support for up to 64 nodes
- Node removal without severing the network
- Simultaneous support for both network-powered (sensors) and self-powered (actuators) devices
- Use of sealed or open-style connectors
- Protection from wiring errors
- Selectable baud rates of 125k baud, 250k baud, and 500k baud. Maximum trunk distance 500 meters and drop length of 156 meters at 125k baud
- Adjustable power configuration to meet individual application needs
- High current capability (up to 8 amps per supply)
- Operation with off-the-shelf power supplies
- Power taps that allow the connection of several power supplies from multiple vendors that comply with DeviceNet standards
- Built-in overload protection
- Power available along the bus: both signal and power lines contained in the trunkline
- Provisions for the typical request/response oriented network communications
- Provisions for the efficient movement of I/O data
- Fragmentation (anything in excess of 8 bytes) for moving larger bodies of information
- Duplicate MAC ID detection

#### 3.2 RS-232 Interface

- 2- or 3-wire physical connection (50 ft maximum) terminating to a DB-9 connector
- Supports "METTLER TOLEDO Continuous" protocol (with STX, checksum)
- Supports "CTPZ" command input to scale terminal
- Automatic detection of serial data format and baud rate

#### 4. Installation

#### 4.1 DeviceNet

The DeviceNet connection consists of a device connector (male contacts) connected to a network connector (female contacts) according to Table 1. Baud rates of 125k, 250k or 500k can be selected by setting DIP switches 1 and 2 according to

Table 2. The MAC ID address range of 0 to 63 is selected by setting DIP switches 3 through 8 according to Table 3.

Screw Terminal	Description	Color
]	V-	Black
2	CAN_L	Blue
3	Drain	Shield
4	CAN_H	White
5	V+	Red

Table 1 Network Connector (Female Contacts)

#### Dip Switch Access

The DIP switches are located under the access plate as shown in Figure 4.1. Gently pry open from top with small flat screwdriver.





Figure 4.1

#### Figure 2 DeviceNet Configuration DIP Switch

DIP Switch 1	DIP Switch 2	Baud Rate
	Swiich Z	Selection
OFF	OFF	125k
OFF	ON	250k
ON	OFF	500k
ON	ON	Reserved

#### Table 2 Baud Rate Selection

DIP Switch 3	DIP Switch 4	DIP Switch 5	DIP Switch 6	DIP Switch 7	DIP Switch 8	MAC
OFF	OFF	OFF	OFF	OFF	OFF	0
OFF	OFF	OFF	OFF	OFF	ON	1
OFF	OFF	OFF	OFF	ON	OFF	2
OFF	OFF	OFF	OFF	ON	ON	3
ON	ON	ON	ON	ON	OFF	62
ON	ON	ON	ON	ON	ON	63

#### Table 3 MAC ID Selection

#### 4.1.1 Termination

Termination of the fieldbus requires a terminating resistor at each end of the fieldbus. The resistors should have a value of 121  $\Omega$ .

## 4.1.2 Environment and Specifications

Specifications	DNB00001000
Physical Dimensions	27 x 120 x 76 mm
Operating Temperature	0° to 55° C (32°F to 131°F)
Power	24 VDC @ 150mA
Enviroment Protection	NEMA 1 / IP20
Mounting	DIN Rail
Approvals	UL/cUL, CSA, CE
Certified	ODVA certified

#### **Minimum Mounting Distances**

#### 4.1.3 Mounting



Horizontal mounting on a vertical DIN rail is not recommended due to heat dissipation requirements. Horizontal mounting does not allow proper ventilation and will void warranty. If only one DNB is used, then horizontal mounting is acceptable provided the DNB is not located directly above other equipment.



Note: Leave at least 3mm of spacing between when mounting multiple DNB's. Failure to do so will void warranty.

#### 4.2 RS-232 Interface

#### 4.2.1 Wiring Instructions

The RS-232 connection consists of a DB9 connector from the METTLER TOLEDO DNB00001000 to the terminals of a scale terminal according to Table 4. See figure 4.3.1 for pin orientation.

DB9 Pinout to METTLER TOLEDO DNB00001000	Name	Description	METTLER TOLEDO Terminal RS-232 Interface Connection
2 (orange)	RXD	RS-232 Receive	TXD
3 (red)	TXD	RS-232 Transmit	RXD
5 (black)	SGND	Signal Ground	Signal Ground

Table 4 RS-232 Connection

#### 4.2.2 Serial Data Format and Baud Rate Settings

The scale terminal serial output should be configured for METTLER TOLEDO Continuous Protocol (Standard) with <u>STX and Checksum enabled</u>. Table 5 lists the possible serial data format and baud rate settings for the METTLER TOLEDO DNB00001000 to successfully autobaud with a scale terminal.

Serial Data Format			Baud Rate					
Stop Bit	Parity	Data	1200	2400	4800	9600	19.2 k	38.4 k
Length		Length						
1	None	7 bits	•	•	•	•	•	•
1	Odd	7 bits	•	•	•	•	•	•
1	Even	7 bits	•	•	•	•	•	•
1	None	8 bits	•	•	•	•	•	•
1	Odd	8 bits	•	•	•	•	•	•
1	Even	8 bits	•	•	•	•	•	•

Table 5 - Possible Serial Data Format and Baudrate Settings

#### 4.3 Power Supply

The METTLER TOLEDO DNB00001000 requires a 24 VDC power source (not included with the unit).



Figure 4.3.1

Figure 3 Power Supply and DB-9 Connection

Pin	Description	Note
1	+24 VDC Power Supply	+ 24 VDC (+/- 20%); max 150 mA @ 24 VDC
2	0 VDC Ground	Power supply ground

Table 6 - Power Supply Wiring

#### 5. Configuration with RSNetWorx for DeviceNet

The EDS file located on the CD-ROM supplied with the DNB00001000 contains configuration information to allow RSNetWorx for DeviceNet to set up a single polled I/O connection between a METTLER TOLEDO DNB00001000 and DeviceNet master/scanner.

#### 5.1 Registration of EDS File

The EDS file must first be registered into RSNetWorx for DeviceNet. This is accomplished using the EDS Wizard.



#### Figure 4 Starting the EDS Wizard

To start the EDS Wizard, select "EDS Wizard..." under the menu option "Tools".



#### Figure 5 EDS Wizard

Click "Next >" in the "EDS Wizard" window to begin the registration process.



#### Figure 6 EDS Wizard (cont.)

Make sure "Register an EDS file(s)" is selected and click " $\underline{N}ext >$ ".



#### Figure 7 EDS Wizard (cont.)

Click "Browse..." to select the EDS file to be registered.

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	DeviceNet		
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	E Barcode Scanner		
	Communication Adapter     DeviceNet to SCANport	EDS Wizard	[
	Dodge EZLINK     General Purpose Discrete I/D		
	Generic Device		
	Human Machine Interface Inductive Proximity Switch		
	E Kinit Switch		
	Rockwell Automation miscellaneou     SCANport Adapter		
	E Smart MCC		
	Vendor     Fockwell Automation - Allen-Brade		
	Rockwell Automation - Dodge     Rockwell Automation - Electro Cra		
	Rockwell Automation - Reliance E	File name: DNB1.eds Open	
		Files of type: EDS Files (*.eds)	
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			Uttline

#### Figure 8 EDS Wizard (cont.)

Select the appropriate location then select file ".EDS\_MT\_V\_2\_00\_01.EDS". Click "Open". (The EDS file is located on the CD-ROM).

DeviceNet - RSNetWorx for DeviceNet		_ 8 ×
<u>File E</u> dit <u>V</u> iew <u>N</u> etwork <u>D</u> evice <u>T</u> ools <u>H</u> e	þ	<b>9 9</b>
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Hardware	X	<u>*</u>
Communication Adapter     Communication Adapter	EDE Weard	
DeviceNet to SCANport      Dodge EZLINK	EDS Wizard	
General Purpose Discrete I/O     General Purpose Discrete I/O     Generic Device     Human Machine Interface     Modeling Device Device	Register Device Electronic Data Sheet file(s) will be added to your system for use in Rockwell Software applications.	
Inductive Proximity Switch     Inductive Proximity Switch     Inductive Proximity Switch     Inductive Proximity Switch	Register a single file	
🗈 🙀 Photoelectric Sensor	C Register a directory of EDS files 🛛 Look in subfolder	
Hockwell Automation miscellaneou     Gran SCANport Adapter	Named:	
E Smart MCC	A:\DNB1.eds	
Verici     Verici     Pockwell Automation - Allen-Bradi     Rockwell Automation - Dodge     Pockwell Automation - Electro-Cra      Rockwell Automation - Reliance El	* If there is an icon file (,ico) with the same name as the file(s) you are registering then this image will be associated with the device. To perform an installation test on the file(s), click Next	
	< <u>B</u> ack <u>N</u> ext> Cancel	
	HILLNIN Graph ( Spreadsheet ) Master/Sli (	×
Message Code Description		
0 0		
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#### Figure 9 EDS Wizard (cont.)

Click "Next >" in the "EDS Wizard" window.

TeviceNet - RSNetWorx for DeviceNet		_ 8 ×
<u>File E</u> dit <u>V</u> iew <u>N</u> etwork <u>D</u> evice <u>T</u> ools <u>H</u> elp	)	<u>a a</u>
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Hardware	<u> </u>	<u>~</u>
	EDS Wizard EDS File Installation Test Results This test evaluates each EDS file for errors in the EDS file. This test does not guarantee EDS file validity.	
Rockwell Automation miscellaneou     ScANport Adapter     Smart MCC     Vendor     Rockwell Automation - Allen-Bradle     Rockwell Automation - Dodge     Rockwell Automation - Electro-Cral     Rockwell Automation - Reliance El     Rockwell Automation - Reliance El	View file More Information	
	<back next=""> Cancel</back>	
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Message Code Description		
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#### Figure 10 EDS Wizard Test Results

Make sure there is a green check mark (indicating the EDS file is valid) next to "EDS\_MT\_V\_2\_00\_01.EDS". Click "Next >" to continue.

DeviceNet - RSNetWorx for DeviceNet		
<u>Eile E</u> dit <u>V</u> iew <u>N</u> etwork <u>D</u> evice <u>T</u> ools <u>H</u> el		<b>9 9</b>
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Hardware		<u>~</u>
Category		
Communication Adapter     DeviceMatter SCANport	EDS Wizard	
Dodge EZLINK		
Generic Device     Generic Device	Change Graphic Image. You can change the graphic image that is associated with a device.	
Human Machine Interface     Inductive Proximity Switch		
Limit Switch      Motor Protector	Product Types           Change icon         Image icon	
Photoelectric Sensor     Rockwell Automation miscellaneou		
SCANport Adapter	Mettler I oledo DNBUUUU1UUU	
Rockwell Automation - Allen-Bradie     Rockwell Automation - Dodge		
Rockwell Automation - Electro-Cral     D     Rockwell Automation - Reliance El		
	< <u>B</u> ack <u>N</u> ext> Cancel	
	H () H Graph ( Spreadsheet ) Master/Str (	
Message Code     Description		
8 8 11		
2 1		

#### Figure 11 EDS Wizard Graphic Image Selection

Make sure the "METTLER TOLEDO DNB00001000" icon is selected. Note: RSNetWorx for DeviceNet may select a default icon. In this case, click the "Change icon..." button to locate and select the dnb1.ico file.

BeviceNet - RSNetWorx for DeviceNet		
<u>File E</u> dit <u>V</u> iew <u>N</u> etwork <u>D</u> evice <u>T</u> ools <u>H</u> i	łp	<b>a e</b>
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Hardware		<u>_</u>
Constant of the second se	EDS Wizard Final Task Summary This is a review of the task you want to complete.  You would like to register the following device. Mettler Toledo DNB00001000	
	To complete the above task, click Next.	
	< <u>₿</u> ack <u>N</u> ext> Cancel	
	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■	v F
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Description		
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#### Figure 12 EDS Wizard (cont.)

Click  $\underline{Next} > in the \underline{EDS} Wizard'' window to register.$ 

DeviceNet - RSNetWorx for DeviceNet	_ <b>8</b> ×
<u>File Edit View Network Device Iools Help</u>	ខ ខ
12   2 - 2   2   2   2   2   2   2   2	
Hardware X	<u> </u>
DeviceNet	
□ · · · · · · · · · · · · · · · · · · ·	
Barcode Scanner	
EDS Wizard	
Completing the EDS Witzard	
Generic Device     Human Machine Interface	
You have successfully completed the EDS Wizard.	
Motor Protector	
Photoelectric Sensor     Consequence of Conseq	
SCANport Adapter	
Pendor Provide Contraction	
Construction - Allen-Bradie     Construction     Construction     Construction     Construction	
Rockwell Automation - Electro-Crai	
E C Hockwell Automation - Heliance El C Hockwell Automation - Heliance El C Hockwell Automation - Heliance El C	
[Finish]	
H ← H Graph ( Spreadsheet ), Master/Siz	 ▶
Message Code Description	
	F
	0.60

## Figure 13 Completing the EDS Wizard

Click "Finish" to exit the EDS Wizard.



#### Figure 14 DeviceNet Category and Vendor

When the EDS Wizard is completed, two METTLER TOLEDO DNB00001000 entries are added to: "DeviceNet" -> "Category" -> "Communication Adapter" and "DeviceNet" -> "Vendor" -> "METTLER TOLEDO" -> "Communication Adapter".

#### 5.2 Setting up an I/O Connection

After the EDS file has been registered, RSNetWorx is used to set up a polled connection between the METTLER TOLEDO DNB00001000 and the DeviceNet master/scanner.



#### Figure 15 RSNetWorx Online Browse

Select "Network" then "Online" to start a browse of the DeviceNet network.



#### Figure 16 Browse for network

Select the appropriate network path. In this case, "1784-PCIDS-1, DeviceNet" is selected. Click "OK" to continue.

*DeviceNet - RSNetWorx for DeviceNet		_ 8 ×
		88
12 🖆 - 🖬 🎒 X 🖻 🛍 😽	⊕ Q   E 性   ♥ • 品 ॼ   2	
Hardware	Mettler Toledo PYRAMID 1756-DNE/A (4) DNB00001000 (5) 01 60 63 Browsing network Found: Device at node 60 Cancel	
	- ∥μ(∢) ▶ μ∖ Graph ( Spreadsheet ). Master/Sk_∢_	<u> </u>
Message Code     Description		F
	Browsing	63

#### Figure 17 Browsing network...

Wait until the network browse is complete. The METTLER TOLEDO DNB00001000 icon should appear. Other slave devices and/or master/scanner icons should appear for devices on the DeviceNet network. In this case, the 1756-DNB/A is the master/scanner on the DeviceNet network.



#### Figure 18 Selection of 1756-DNB/A

The METTLER TOLEDO DNB00001000 needs to be included in the scanlist of the 1756-DNB/A. Right click on the 1756-DNB/A icon in the "Graph" window. Then select Properties..."

23	*DeviceNet - RSNetWorx for DeviceNet		Β×
Π	29 1756-DNB/A (4) ? 🗙	×	88
Ī	General Module Scanlist Input Output ADR Summary		
г	1756-DNB/A	ettler Toledo PYRAMID 1756-DNB/A (4)	
	Name: 1756-DNB/A (4)		
	Description:		
		01 60 53	
	Address: 63		
	Device Identity [ Primary ]		
	Vendor: Rockwell Automation - Allen-Bradley [1]		
	Device: Communication Adapter [12]		
	Product: 1756-DNB/A [14]		
	Catalog: 1756-DNB/A		
	Revision: 3.005		
	OK Cancel Apply Help		
	Hockwell Automation - Heliance Electric		
L		N∖ Graph ∕ Spreadsheet ) Master/Sk ( )	Ŀ
×	Message Code Description		7
	2000000B Node 63: The scanner may be unavailable for 5-	5-10 seconds while updating Flash memory.	
des			
esse			
M	•		F
		Online - Not Brow	sina

#### Figure 19 1756-DNB/A Properties

The 1756-DNB/A properties window will be displayed. Click the "Scanlist" tab in the "1756-DNB/A" window.

21	DeviceNet - BSNetWorx for DeviceNet		
Ť	General Module Scanlist Input Output ADR Summary	崔 課 - 읆 國 🎽	<u>,                                    </u>
	1756-DNB/A	ettler Toledo PYRAMID 1756-DNB/A (4) 8800001000	<u> </u>
	Name: 1756-DNB/A (4)		
E	Scanner Configuration Applet 🛛 🔀		
	Do you want to upload the configuration from the device, updating the software's configuration; or download the software's configuration to the device, updating the device?	01 60 33	
	For more information, press F1		
	Upload Download Cancel		
Γ	Product: 1756-DNB/A [14]	Π	
	Catalog: 1756-DNB/A		
	Revision: 3.005		
	OK Cancel Apply Help	j	
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	Message Code Description		
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		Online - Not Brow	eina

## Figure 20 Scanner Configuration Applet

Click the "Upload" button in the "Scanner Configuration Applet" window.

39 	DeviceNet - BSNetWorx for DeviceNet	<u>ها_</u> ۲	×
	General Module Scanlist Input Output ADR Summary		
Г	Available Devices: <u>S</u> canlist:	ettler Toledo PYRAMID 1756-DNB/A (4) IB00001000	-
	~		
	Automap on Add     Node Agtive		
	Upload from Scanner		
	Download to Scanner		
	Migor or bigher		
_	UK Lancel Apply Help		
	[		-
		Graph (Spreadsheet ) Master/Slz •	<u>ر</u>
	Message Code Description		F
iges 🗆			
Messa	4		,
_		Online - Not Browsir	

#### Figure 21 1756-DNB/A Scanlist

De-select the "Automap on Add" option. This allows manual mapping of the input and output files. Click the "METTLER TOLEDO DNB00001000" icon under "Available Devices" then click the ">" button to add the device to the "Scanlist".

* DeviceNet - BSNetWorx for DeviceNet	-	₽×
General Module Scanlist Input Output ADR Summary	▲ 【注】課▼品 図 <mark>漢</mark>	<u>; ; ;</u>
Available Devices:       Scanlist:         Image: Available Devices:       Scanlist:         Image: Available Devices:       Image: Available Devices:         Image: Devices:       Image: Available Devices:         Image: Devices:       Image: Available Devices:         Image: Devices:       Image: Product Code         Image: Devices:       Image: Product Code         Image: Devices:       Image: Product Code         Image: Device:       Image: Product Code         Image: Device: <th>titler Toledo       PYRAMID       1756-DNB/A (4)         1000000000000000000000000000000000000</th> <th></th>	titler Toledo       PYRAMID       1756-DNB/A (4)         1000000000000000000000000000000000000	
	I <b>\ Graph</b> ( Spreadsheet ) Master/Slk ↓	<u>ب</u>
Message Code Description		
	Online Mat Day	

## Figure 22 - 1756-DNB/A Scanlist (cont.)

The METTLER TOLEDO DNB00001000 should now be in the 1756-DNB/A scanlist. Click the "Input" tab in the "1756-DNB/A" window.

VericeNet - BSNetWorx for DeviceNet	
General Module Scanlist Input Output ADR Summary	
Node Type Rx Map AutoMap	ettler Toledo PYRAMID 1756-DNB/A (4)
<u>∐rmap</u>	
Agvanced	
Mgmory: Assembly Data Start DWord:	
Bits 31 - 0	
11.Deta[1] 11.Deta[2] 11.Deta[3] 12.Deta[4] 14.Det	
1.1.Data[4] 1.1.Data[5] 1.1.Data[6] 1.1.Data[7]	
1:1.Data(8)	
	N\Graph ∫ Spreadsheet λ Master/SI₂ [◀]
Message Code Description	
× ×	
	Quille Mat Description

#### Figure 23 1756-DNB/A Input File

The input file of the 1756-DNB/A is now displayed. In this case, the 1756-DNB/A does not have any devices mapped into the input file. Click the "Advanced" button.

Device	eNet - BSNetWorx for DeviceNet		×
Genera	al Module Scanlist Input Dutput ADR Summary		<u>a a</u>
	de Type Rx Map Aritak vanced Mapping : 01, Mettler Toledo DNB000010 💡	HITER Toledo PYRAMID 1756-DNB/A (4)	
	Map         Message         Offset         Memory         Offset         Bit Len           1         Polled         0:0         Assembl         0:0         40           2 <not mapped="">         4         <not mapped="">         4</not></not>		
	Map From: Message: Polled  Memory: Assembly Data Byte: 0 Byte: 0 Memory: Assembly Data DWord: 0 Assembly Data		
	Close     Bit Length:     140		
	Rockwell Automation - Reliance Electric		
		( ∢ ▶ Ħ\ <b>Graph</b> ( Spreadsheet ), Master/Sl₂ ( √ )	<u>ب</u> ا
Messi	age Code Description		
Mess			>
			Online Mat Promoine

#### Figure 24 1756-DNB/A Input File Advanced Mapping

Select "Polled" from the "Message:" drop list in "Map From:". Select the appropriate dword offset in "Map To:" In this case, since there are no devices mapped into the input file, the dword offset is set to 0. Click the "Apply Mapping" then "Close" buttons.

24	DeviceNet - BSNetWorx for DeviceNet	₽×
	General Module Scanlist Input Output ADR Summary	88
[	Node         Type         Rx         Map         AutoMap           Matter To         Folled         5         1:1.Data[0].0         ettler Toledo         PYRAMID         1756-DNB/A (4)           Ummap         Ummap         Ummap         Ummap         Ummap         Ummap	<u> </u>
	Mgmory: Assembly Data Start DWord: 0 -	
	1:Data[1] 01, Metter Vielos IN6000000031 1:Data[2] 1:Data[3]	
	1:I.Data[4] 1:I.Data[5] 1:I.Data[6]	
	13:Data//	
	H I I H Graph ∫ Spreadsheet λ Master/Sk I	• •
× □	Message Code Description	
ages 🗆		
Mess	۹	Þ
	Online Net Down	

#### Figure 25 1756-DNB/A Input File (cont.)

The response part of the polled I/O connection has been setup. The 5 byte response from the METTLER TOLEDO DNB00001000 has been mapped into dwords 1:I.Data[0] and 1:I.Data[1] of the 1756 DNB/A scanner.

가 DeviceNet - BSNetWorx for DeviceNet		×
		1
	推  禄 • 品 國 [ 🏭	
r Wold Type Tx Map AutoMap AutoMap	ettler Toledo PYRAMID 1756-DNB/A (4)	
Unmap		
A <u>d</u> vanced		
Dptions	01 60 53	
Memory: Assembly Data V Start DWord: 0		
Bits 31 - 0		
1:0.Data[0] 1:0.Data[1]		
1:0.Data[2] 1:0.Data[3]		
1:0.Data[4] 1:0.Data[5]		
1:0.Data[6] 1:0.Data[7]		
1:0.Data[8]		
OK Cancel Apply Help		
Rockwell Automation - Reliance Electric		
		-
	M\Graph (Spreadsheet ) Master/Sla	
Message Code Description		
 9		
20 20		
	Q-E- Mat Parmi	

#### Figure 26 1756-DNB/A Output File

Click the "Output" tab to select the output file. Click the "Advanced" button in the 1756-DNB/A window.

Image: Series Series     Image: Series	e× e i
Node       Type Tx Map       ØxinMan         Advanced Mapping : 01, Mettler Toledo DNB000010 ? X         Map       Message       Offset         1       Polled       0:0       Assembl         2       cnot mappedb       4         4       cnot mappedb       4         Map       Form:       Memory:         Mapsage:       Polled       Map To:         Message:       Polled       Map To:         Message:       Polled       Map To:         Byte:       0       -         Bit:       0       -         Bit:       0       -         Bit:       0       -	4
Help Delete Mapping Apply Mapping	1
Message Code Description	Þ

#### Figure 27 1756-DNB/A Output File Advanced Mapping

Select "Polled" from the "Message:" drop list in "Map From:" Select the appropriate dword offset in "Map To:" In this case, since there are no devices mapped into the output file, the dword offset is set to 0. Click the "Apply Mapping" then "Close" buttons.

A Topological State Control St	_ & ×
	<u>e (</u>
General Module Scanist Input Output ADH Summary	
r ØØ 01, Mettler T Polled 1 1:0.Data[0].0 AutoMap AutoMap Ittler Toledo PYRAMID 1756-DNB/A (4)	-
Mgmory: Assembly Data 🖌 Start DWord: 0 🔄	
1:0.Data[1] 1:0.Data[1]	
1:0.Data[2] 1:0.Data[3]	
1:0.Data[5] 1:0.Data[6]	
1:0.Data[7] 1:0.Data[8]	
OK Cancel Apply Help	
M ∢ ▶ M \ Graph ( Spreadsheet ) Master/Sik ↓	ب ۲
zj rt Messana Code Description	
	F
Online	- Not Browsing

#### Figure 28 1756-DNB/A Output File (cont.)

The request part of the polled I/O connection has been setup. The 1 byte request to the METTLER TOLEDO DNB00001000 has been mapped into dword 1:0.Data[0] of the 1756 DNB/A scanner.

24	*DeviceNet - RSNetWorx for DeviceNet		×
T	1756-DNB/A (4)		í
Ī	General Module Scanlist Input Output ADR Summary		
Г	Node Type Tx Map AutoMap	ettler Toledo PYRAMID 1756-DNB/A (4) NB00001000	1
	<u>U</u> nmap		
	Advanced		
	Scanner Configuration Applet	J 01 60 🗕	
	Do you want to download these changes to the device?		
	1:0.Data[1] 1:0.Data[2]		
	1:0.Data[3] 1:0.Data[4]		
	1:0.Data[5] 1:0.Data[6] 1:0.Data[6]		
	1:0.Data[8]		
	OK Cancel Apply Help		
	Hockwell Automation - Heliance Electric		
	г		
L		► M\ Graph ( Spreadsheet ) Master/Sk <	Ľ
×	Message Code Description		1
 s			
ssage			
Mes	<b>د</b> ا		1
		Online Nat Drawnin	

#### Figure 29 - Scanner Configuration Applet

Click "Yes" in the "Scanner Configuration Applet" window to save the scan table in the 1756-DNB/A. RSNetWorx will display a message indicating that it will take five to ten seconds for the scanner to be updated in the "Message" window. The 1756-DNB/A is now able to send and receive data from the METTLER TOLEDO DNB00001000.

## 6. Data Format

#### 6.1 Continuous Mode Output

Data from the scale terminal is sent to the METTLER TOLEDO DNB00001000 in continuous mode output format according to Table 7. Note: The STX and CKSM characters are optional in the continuous mode output. However, the continuous mode output must contain the STX and CKSM characters in order for the METTLER TOLEDO DNB00001000 to autobaud and communicate with a scale terminal. For further information on how to set these options, refer to the terminal technical manual.

Character	Function			
1	STX – Start of Text			
2	Status Byte A			
3	Status Byte B			
4	Status Byte C			
5	Weight MSD			
6	Weight			
7	Weight			
8	Weight			
9	Weight			
10	Weight LSD			
11	Tare Weight MSD			
12	Tare Weight			
13	Tare Weight			
14	Tare Weight			
15	Tare Weight			
16	Tare Weight LSD			
17	CR – Carriage Return			
18	CKSM – Checksum			

Table 7 Continuous Mode Output Format

#### 6.2 Output Assembly

The output assembly is the response from the METTLER TOLEDO DNB00001000 to the DeviceNet master/scanner and consists of the status byte and floating-point scale value (4 bytes).

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit O
Not Used	Not Used	Print	Motion	Over-	Minus	Gross /	Comm
				Capacity	Sign	Net	Error

#### Table 8 Scale Status Byte Format

Bit 6 – Not Used Bit 5 – Print Request

1 – Print request

- Bit 4 Motion
- Bit 3 Over Capacity
- Bit 2 Minus Sign

Bit 0 – Communications Error

Bit 1 – Gross / Net

1 – Negative measurement 1 – Net / 0 – Gross

1 – Motion detected

1 - Scale is over / under set capacity

1 – Communications error\* / Timeout or invalid port setup

#### \*Note: If Communications error bit is set, all data should be considered invalid.

Byte 1	Byte 2	Byte 3	Byte 4	
Floating Point Byte	Floating Point Byte	Floating Point Byte	Floating Point Byte	

Table 9 Floating Point Scale Value Format

#### 6.3 Input Assembly

The input assembly is a command from the DeviceNet master/scanner to the METTLER TOLEDO DNB00001000 and consists of a single byte. The input assembly selects the internal adapter register or instructs the METTLER TOLEDO DNB00001000 to send a command to the scale terminal according to Table 10.

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Not Used	Not Used	Z	Р	Т	С	Tare	Record
						Weight	Weight

Table 10 Input Assembly Format

Bit 7 – Not Used

Bit 6 – Not Used

Bit 5 - 1'' Sends ASCII Z to scale terminal

Bit 4 – "1" Sends ASCII P to scale terminal

Bit 3 – "1" Sends ASCII T to scale terminal

Bit 2 – "1" Sends ASCII C to scale terminal

Bits 0 and 1 select the internal adapter register according to Table 11.

Bit 1	Bit O	Selects Internal Adapter Register
0	0	Displayed Weight Register
0	1	Recorded Displayed Weight Register
1	0	Tare Weight Register
1	1	Recorded Tare Weight Register

Table 11 Internal Adapter Register Selection

#### 6.4 Internal Adapter Registers

The METTLER TOLEDO DNB00001000 contains four internal adapter registers for storing the status byte and floating point weight value reported from the scale terminal. The format of the internal adapter registers is shown in Table 12.

Internal Adapter	Byte 7	Byte 6	Byte 5	Byte 4	Byte 3	Byte 2	Byte 1	Byte O
Register								
Displayed	Not	Not	Single P	Precision F	loating Poi	nt Value	Not	Status
Weight	Used	Used	MSB			LSB	Used	Byte
Tare Weight	Not	Not	Single P	Precision F	loating Poi	nt Value	Not	Status
	Used	Used	MSB			LSB	Used	Byte
Recorded	Not	Not	Single P	Precision F	loating Poi	nt Value	Not	Status
Displayed	Used	Used	MSB			LSB	Used	Byte
Weight								
Recorded Tare	Not	Not	Single P	Precision F	loating Poi	nt Value	Not	Status
Weight	Used	Used	MSB			LSB	Used	Byte

#### Table 12 Internal Adapter Register Format

Note: The status byte and floating point scale value are aligned on an even address in the internal adapter registers. The single precision floating point scale value is stored in the internal adapter register in big endian format.

## 7. Operation

#### 7.1 Initial Conditions

When the METTLER TOLEDO DNB00001000 is power-cycled, the four internal floating point adapter registers are initialized to NAN, and all other status and unused bytes are set to 0FFH, according to Table 13.

Internal Adapter Register	Byte 7	Byte 6	Byte 5	Byte 4	Byte 3	Byte 2	Byte 1	Byte O
Displayed Weight	OxFF	OxFF	NAN Oxff	NAN Oxff	NAN Oxff	NAN Oxff	OxFF	OxFF
Tare Weight	OxFF	OxFF	NAN OxFF	NAN OxFF	NAN OxFF	NAN OxFF	OxFF	OxFF
Recorded Displayed Weight	OxFF	OxFF	NAN OxFF	NAN OxFF	NAN OxFF	NAN OxFF	OxFF	OxFF
Recorded Tare Weight	OxFF	OxFF	NAN OxFF	NAN OxFF	NAN OxFF	NAN OxFF	OxFF	OxFF

Table 13 Internal Adapter Registers Initial Contents

#### 7.2 AutoBaud Mode

The METTLER TOLEDO DNBO0001000 will enter autobaud mode upon initialization or when a communications error has occurred with the scale terminal. A communications error is either a timeout condition (two seconds have elapsed without the METTLER TOLEDO DNB00001000 receiving one packet of continuous mode output from the scale terminal) or two consecutive checksum errors have occurred. When the METTLER TOLEDO DNB00001000 is in autobaud mode, the internal adapter registers are set according to Table 14. Bytes 1 to 7 are set to 0FFH. Byte 0, the status byte, is set to 0x01, indicating a communications error. The METTLER TOLEDO DNB00001000 remains in autobaud mode until the serial data format / baud rate has been determined and one packet of continuous mode output has been received from the scale terminal.

Internal Adapter	Byte 7	Byte 6	Byte 5	Byte 4	Byte 3	Byte 2	Byte 1	Byte O
Regisiel								
Displayed			NAN	NAN	NAN	NAN		Status
Weight	OxFF	Byte						
								0x01
Tare Weight			NAN	NAN	NAN	NAN		Status
_	OxFF	Byte						
								0x01
Recorded			NAN	NAN	NAN	NAN		Status
Displayed	OxFF	Byte						
Weight								0x01
Recorded Tare			NAN	NAN	NAN	NAN		Status
Weight	OxFF	Byte						
-								0x01

Table 14 Internal Adapter Register Contents in Autobaud Mode

#### 7.3 Normal Mode

When the METTLER TOLEDO DNB00001000 enters normal mode, the continuous mode output described in section 6.1 is converted to an output assembly format described in section 6.2. The output assembly is then written to the IN area of DPRAM. The METTLER TOLEDO DNB00001000 also accepts commands from a DeviceNet master/scanner via the input assembly (described in section 6.3) by reading the OUT area of DPRAM.

#### 7.3.1 DPRAM IN Area

The output assembly is written to the IN area of DPRAM according to Table 15. Note: The floatingpoint scale value is placed in the IN area of DPRAM in little endian format.

Byte	Byte Name
0	Scale Status
1	Floating Point Scale Value Byte MSB
2	Floating Point Scale Value Byte
3	Floating Point Scale Value Byte
4	Floating Point Scale Value Byte LSB

Table 15 DPRAM IN Area Contents

#### 7.3.2 DPRAM OUT Area

Commands from the DeviceNet master/scanner are read from the OUT area of DPRAM. The command from the DeviceNet master/scanner follows the input assembly format described in section 6.3.

Byte	Byte Name
0	Command from DeviceNet master/scanner

Table 16 DPRAM OUT Area Contents

#### 8. Indication LED's

The METTLER TOLEDO DNB00001000 has 6 LED's. They are described below.



#### Figure 30 Mother Circuit Bd External LED's

LED	LED Color	Description		
DNB Hardware Status	Steady OFF	no power		
DNB Hardware Status	Steady Red	DNB unrecoverable hardware fault		
DNB Hardware Status	Steady Green	DNB operational hardware-wise		
DNB Hardware Status	Flashing Red	minor hardware fault		
Devicenet Network Status	Steady OFF	DeviceNet not powered / Not on-line		
Devicenet Network Status	Steady Green	link OK, on-line, connected		
Devicenet Network Status	Steady Red	Devicenet critical link failure		
Devicenet Network Status	Flashing Green	DeviceNet on-line, not connected*		
Devicenet Network Status	Flashing Red	connection timeout with scanner		
Scale Communication Status	Steady Green	scale communications OK		
Scale Communication Status	Steady Red	no scale communications **		
DNB Software Status	Steady Green	DNB internal software operational		
DNB Software Status	Steady Red	DNB internal software faulted		

Table 17 External Module and Network Status Indication LEDs

\* Note- DNB may not be in scan list, open network commissioning tool and add to scanlist.

\*\*Note- Refer to table 4.2.2 to confirm terminal port parameters.



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