NETWORK GATEWAY SERIES

ICC

INDUSTRIAL CONTROL COMMUNICATIONS, INC.

DNET-100

DEVICENET
MULTIPROTOCOL NETWORK GATEWAY

December 2003
ICC #10519-1.000-000

Introduction

Thank you for purchasing the ICC DNET-100 DeviceNet Multiprotocol Network Gateway. The DNET-100 allows information to be transferred seamlessly between different fieldbus networks with minimal configuration requirements. The DNET-100 provides a DeviceNet connection (the "primary" network), as well as secondary network connections comprised of an RS-485 port and three independent common serial ports for direct connectivity to Toshiba 7-series, 9-series or VF-nC1 Adjustable Speed Drives (ASDs). These various communication ports currently provide support for the following networks:

- DeviceNet (primary network port)
- Modbus RTU (RS-485 master)
- Sullair Supervisor network (RS-485 master)
- Toshiba ASD (common serial master)

New secondary network drivers are continuously being added, and can be downloaded for free from our web site.

Before using the DNET-100 network gateway, please familiarize yourself with the product and be sure to thoroughly read the instructions and precautions contained in this manual. In addition, please make sure that this instruction manual is delivered to the end user of the DNET-100, and keep this instruction manual in a safe place for future reference or unit inspection.

This instruction manual describes the device specifications, wiring methods, maintenance procedures, supported functions, usage methods and firmware update procedures for the DNET-100 network gateway.

For the latest information, support, firmware releases or product point files, please visit http://www.iccdesigns.com.

Before continuing, please take a moment to ensure that you have received all materials shipped with your kit. These items are:

- DNET-100 interface in DIN rail mountable case
- 2 meter DB9-RJ45 MMI port cable (part number 10425)
- This manual

DNET-100 DeviceNet Multiprotocol Network Gateway
User's Manual

Part Number 10519-1.000-000
Printed in U.S.A.

Industrial Control Communications, Inc. reserves the right to make changes and improvements to its products without providing notice.

Notice to Users

INDUSTRIAL CONTROL COMMUNICATIONS, INC.'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE-SUPPORT DEVICES OR SYSTEMS. Life-support devices or systems are devices or systems intended to sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling and user's manual, can be reasonably expected to result in significant injury.

No complex software or hardware system is perfect. Bugs may always be present in a system of any size. In order to prevent danger to life or property, it is the responsibility of the system designer to incorporate redundant protective mechanisms appropriate to the risk involved.

Usage Precautions

Operating Environment

- Please use the gateway only when the ambient temperature of the environment into which the unit is installed is within the following specified temperature limits:

  Operation: -10 ~ +50°C (+14 ~ +122°F)
  Storage: -40 ~ +85°C (-40 ~ +185°F)
- Avoid installation locations that may be subjected to large shocks or vibrations.
- Avoid installation locations that may be subjected to rapid changes in temperature or humidity.

Installation and Wiring

- Proper ground connections are vital for both safety and signal reliability reasons. Ensure that all electrical equipment is properly grounded.
- Route all communication cables separate from high-voltage or noise-emitting cabling (such as ASD input/output power wiring).

ASD Connections

- Do not touch charged parts of the drive such as the terminal block while the drive's CHARGE lamp is lit. A charge will still be present in the drive's internal electrolytic capacitors, and therefore touching these areas may result in an electrical shock. Always turn all drive input power supplies OFF, and wait at least 5 minutes after the CHARGE lamp has gone out before connecting communication cables.
- To avoid misoperation, do not connect any gateway terminals to either the ASD's E/GND terminals, the motor, or to any other power ground.
- When making common serial connections between the gateway and ASDs, do not use cables that exceed 5 meters in length.
- For further drive-specific precaution, safety and installation information, please refer to the appropriate documentation supplied with your drive.
- Internal ASD EEPROMs have a limited life span of write cycles. Observe all precautions contained in this manual and your ASD manual regarding which drive registers safely may and may not be repetitively written to.
- When used without an auxiliary power source (ASD common serial mode), the gateway derives its control power from the connected drives. Therefore, removing power to all connected drives will also cause the gateway to lose power.

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1. The Network Gateway Series Concept

The DNET-100 is a member of the ICC Network Gateway Series product family. Members of this family are designed to provide a uniform interface, configuration and application experience. This commonality reduces the user's learning curve, reducing commissioning time while simplifying support.

The heart of the Network Gateway Series concept is an element called the "point database" (refer to Figure 1). The point database is entirely user-configurable, and provides the end-to-end mapping information that allows primary network requests to be routed to the correct locations on the secondary network, while at the same time ensuring that the content of the request will be understood once it gets there. Additionally, the point database provides the added benefit of "data mirroring", whereby current copies of point values (secondary network data objects) are maintained locally within the gateway itself. This greatly reduces the primary network's request-to-response latency time, as read and write requests can be entirely serviced locally, thereby eliminating the time required to execute a secondary network transaction.

When properly configured, the gateway will become essentially "transparent" on the networks, and the primary network master can engage in a seamless dialogue with one or more secondary network devices. This can all be accomplished without regard to the characteristics (physical layer or protocol) of the primary or secondary network.

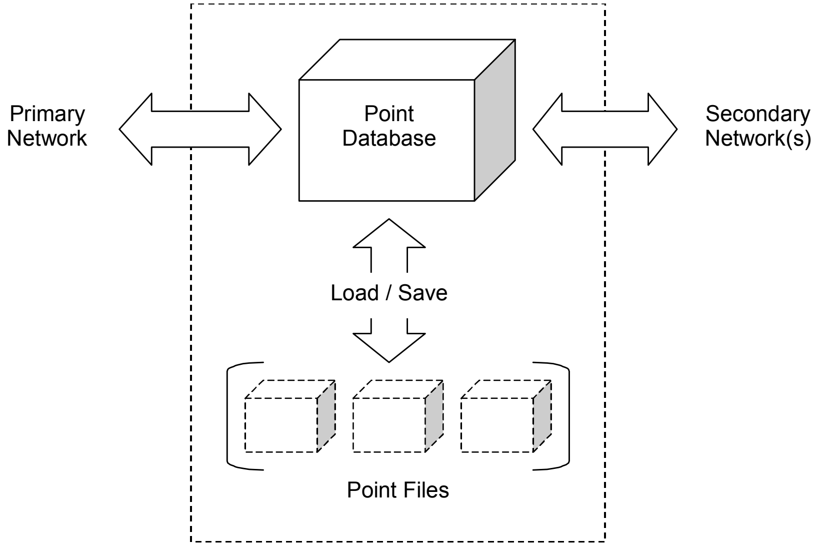
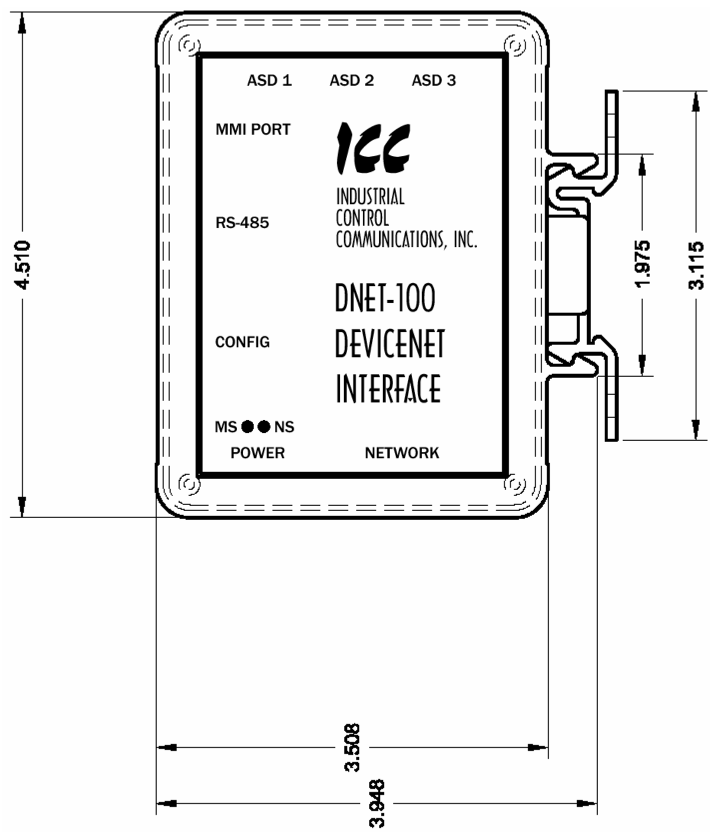


Figure 1: The Network Gateway Series Concept

2. Mechanical Diagrams

2.1 Enclosure



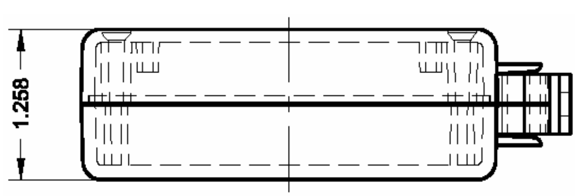


Figure 2: Enclosure Dimensions (units are inches)

2.2 Mounting Clip

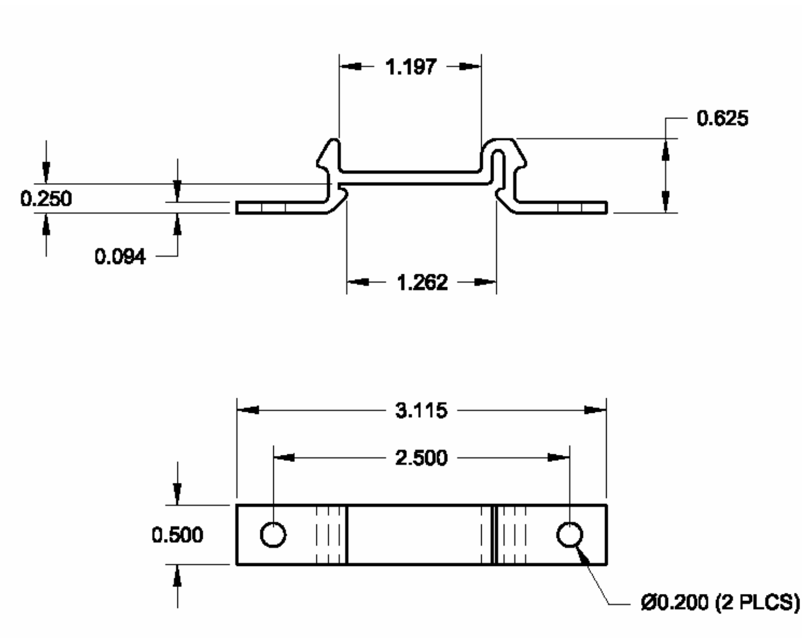


Figure 3: Mounting Clip Dimensions (units are inches)

2.3 External Interface

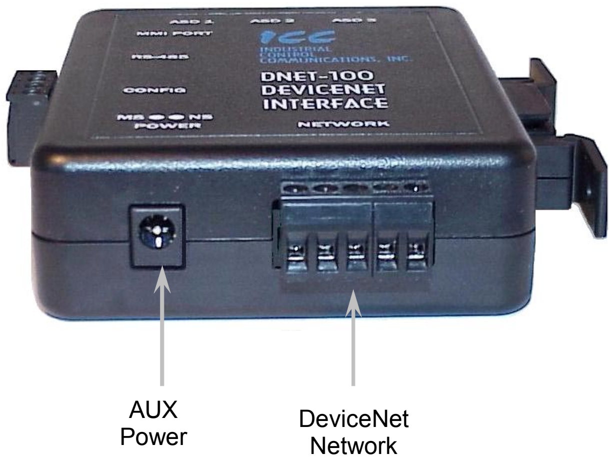


Figure 4: Bottom View

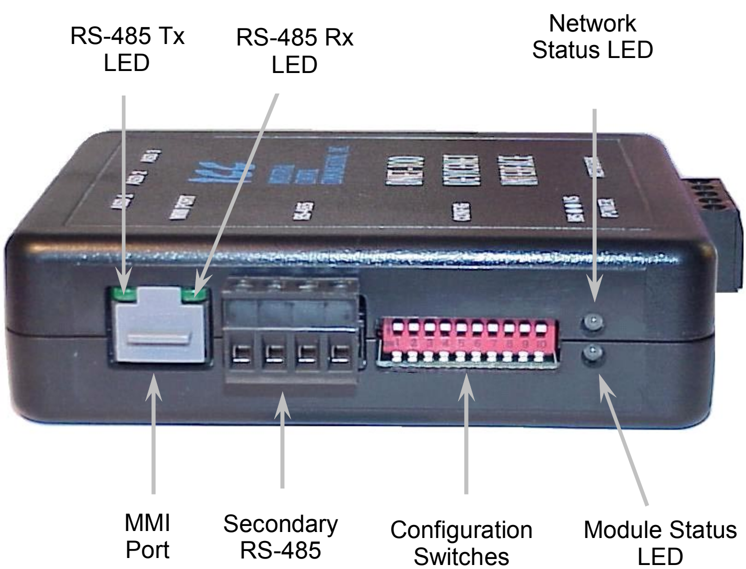


Figure 5: Front View

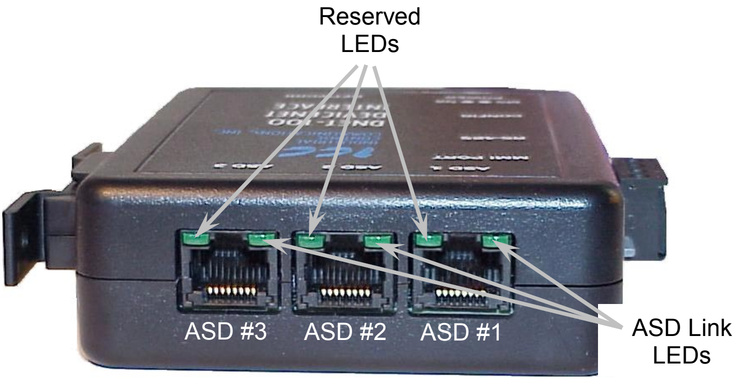


Figure 6: Top View

3. Feature Summary

Primary Network

DeviceNet (5-conductor pluggable terminal block style)

Secondary Network

The DNET-100 has two physically independent secondary networks, depending on the application:

- **ASD common serial:** The DNET-100 provides support for simultaneous connection of three Toshiba 7-series, 9-series or VF-nC1 ASDs via the drives' common serial (aka logic level) communication ports. ASD connections use the same standard RJ45 style 8-conductor UTP patch cables: any standard CAT5 Ethernet cable (found in most electronics stores) 5 meters or less in length can be used to connect the DNET-100 to the drives.
- **RS-485:** Half-duplex RS-485 (A / B / Signal Ground / Shield)

Power Supply

When connected to ASDs via the ASD 1 / ASD 2 / ASD 3 ports, can be either powered directly from the attached ASDs, or from the auxiliary "POWER" input jack. All RS-485 secondary network topologies require the use of the auxiliary "POWER" input.

Supported Protocols

- Primary Network
  - DeviceNet (per ODVA specifications)
- Secondary Network
  - Toshiba ASD (common serial)
  - Modbus RTU (RS-485)
  - Sullair Supervisor (RS-485)

New secondary network drivers are continuously being added, and can be downloaded for free from the ICC web site.

DeviceNet Compatibility

Group 2 Server Only device utilizing the Predefined Master / Slave Connection Set. Supports the Polled and COS/Cyclic I/O connections, with consumed and produced data sizes for each connection independently selectable from 0 to 200 bytes. This product has been self-tested by ICC, Inc. and found to comply with ODVA Conformance Test Software Version A-13.

Text-Based Console Configuration

The unit is configured via a text-based console interface, available over RS232 by using the included MMI cable and a standard PC terminal program such as Microsoft Windows HyperTerminal®.

Point File-Based Configuration

Up to 3 point files (primary / secondary network mapping definition files) can be stored in the unit's internal battery-backed file system. Point files can also be uploaded from / downloaded to a PC, which provides the capability for PC-based file backup and easy configuration copying to multiple units. Sample point files and related documentation can also be downloaded from the ICC web site, uploaded to a unit, and custom-modified to suit a specific application.

Drive AutoScan Algorithm

ASD common serial port connections are automatically established and continuously monitored (when points are defined for that drive). No drive configuration needs to be performed to connect the gateway to the drives. Just plug it in – it's that simple.

Network Timeout Action

A configurable network timeout selection can be programmed that allows each DeviceNet parameter object to have its own unique "fail-safe" condition in the event of a primary network interruption event.

Indicators

2 green LEDs exist on each of the ASD ports and on the MMI port connector. The DNET-100 also contains bicolor DeviceNet network status (NS) and module status (MS) LEDs. Refer to section 9 for more detailed information about the LED indicators and their meanings.

MMI Port Connector

RS232-level. Use the DB9-to-RJ45 MMI cable supplied with the gateway kit to interface with the unit for either console-based configuration, point file upload/download, or flash firmware downloading.

EDS Autogenerator

The DNET-100 automatically generates a customized Electronic Data Sheet (EDS) once configuration is complete. This EDS is then transmitted to your computer via the Xmodem protocol for registration by network configuration tools.

Field-Upgradeable

As new firmware becomes available, the gateway unit can be upgraded in the field by the end-user. Refer to section 15 for more information.

Versatile 3-Way DIN-Rail Mounting System

The unit's enclosure is provided with a mounting clip attached to the rear of the unit. This clip allows the unit to be mounted 3 different ways:

- For DIN rail mounting, snap the mounting clip onto a standard DIN rail, and then snap the unit enclosure onto the clip's retaining tabs. This allows easy removal or repositioning of the unit on the DIN rail during wiring.

- For panel mounting, the mounting clip can be bolted directly to a flat panel via the two bolt holes at the top and bottom of the clip. Refer to section 2.2 for mounting clip mechanical details. Once the mounting clip is securely attached to the panel, the unit enclosure can be snapped onto the clip's retaining tabs.
- For fixed DIN rail mounting, a combination of the above two techniques can be employed. First, snap the mounting clip onto a DIN rail and position it in its desired location. Then, the mounting clip can be bolted to the DIN rail support panel, securing it in place. Lastly, the unit can be snapped onto the fixed mounting clip.

In all cases, the unit can be easily unsnapped from the mounting clip whenever necessary to provide easier access.

4. Installing the Interface

The installation procedure of the gateway will vary slightly depending on the chosen secondary network.

4.1 RS-485 Secondary Network

Note that in order to power the unit when using the secondary RS-485 network, you must also purchase the optional 120VAC/9VDC power supply (ICC part number 10456).

1. Attach the mounting clip and unit enclosure in your desired manner (refer to page 12 for more information).
2. Connect the DeviceNet network to the 5-position "Network" terminal block. Be sure to follow all published guidelines pertaining to DeviceNet network connections, layout and routing. Ensure that the terminal block is fully seated into the terminal block header, and route the network cable such that it is located well away from any electrical noise sources, such as ASD input power or motor wiring. Also take care to route the cable away from any sharp edges or positions where it may be pinched.
3. Repeat step 2 above to connect the secondary network to the "Secondary RS-485" terminal block.
4. Take a moment to verify that the gateway and all network cables have sufficient clearance from electrical noise sources such as drives, motors, or power-carrying electrical wiring.
5. Connect the power supply to the gateway's "Power" jack.

4.2 Toshiba ASD (Common Serial) Secondary Network

The gateway connects to each drive via the drive's common serial (logic level) communication port, typically located on either the main drive control board (G7), on the front of the drive enclosure under a small snap-on cover (A7, S9), on the right-hand side of the drive enclosure under a small snap-on cover (S7), or on the bottom side of the drive enclosure (VF-nC1). Although in general no drive parameters need to be configured in order to use the gateway, it is advantageous to check that the drive's common serial communication data rate is set to its maximum speed. Because the gateway will communicate to each drive only at the drive's configured data rate, this will provide the fastest response time for drive-to-gateway data transfers. For information on checking the drive's common serial communication data rate, refer to the appropriate manual supplied with your drive.

Note that the common serial communication parameters of each drive are handled independently by the gateway, which means that different drive families may be connected to different channels of the unit in any combination, and that the drives connected to each channel may simultaneously communicate to the unit at completely different baud rates, parity settings, etc.

Drives can be connected to the gateway on any ASD channel in any order or combination. When more than one drive is connected to the unit, or if the optional auxiliary power supply is used, the gateway will draw its control power from the source with the highest power supply voltage.

Installation of the gateway should only be performed by a qualified technician familiar with the maintenance and operation of the connected drives. To install the gateway, complete the steps outlined in the following sections related to your specific drive.

4.2.1 Installation for G7 ASDs

1. ⚡ **CAUTION!** Verify that all input power sources to the drives to be connected have been turned OFF and are locked and tagged out.
2. ⚠ **DANGER!** ⚡ Wait at least 5 minutes for the drive's electrolytic capacitors to discharge before proceeding to the next step. **Do not touch any internal parts with power applied to the drive, or for at least 5 minutes after power to the drive has been removed. A hazard exists temporarily for electrical shock even if the source power has been removed.** Verify that the CHARGE LED has gone out before continuing the installation process.
3. Attach the mounting clip and gateway enclosure in your desired manner (refer to page 12 for more information).

4. Remove the drive's front cover / open the drive's cabinet door (refer to the appropriate drive manual for instructions how to do this).
5. The drive's LCD panel (also called the "Electronic Operator Interface" or "EOI") can communicate with the drive via either the RS485/RS232 channel (CNU1/CNU1A) or the common serial channel (CNU2/CNU2A). Because the gateway uses the common serial channel, the LCD panel must be configured to use the RS485/RS232 channel. If the drive to be connected is currently using CNU2 (on the drive control board) and CNU2A (on the LCD panel), then this connection must first be switched over to CNU1 (on the drive control board) and CNU1A (on the LCD panel). Refer to Toshiba's documentation for any precautions or notices regarding this connection change. If the LCD panel is already connected via the RS485/RS232 channel, then no change is required.
6. Configure the drive's LCD panel to communicate via the RS485/RS232 channel by setting parameter "`Communication Setting Parameters.. Communication Settings.. Select LCD Port Connection`" to "`RS485/232 serial`".
7. Connect the drive's common serial communication port (CNU2) to one of the ASD channels of the gateway with the communication cable (communication cable is not included with the gateway kit). When choosing cables for this connection, standard 24 AWG category 5 (CAT5) unshielded twisted-pair (UTP) 8-conductor cables found in Ethernet networks in most office environments can be used. The maximum allowable length for these cables is 5 meters. Although there are many varieties and styles of CAT5 UTP cables available, ICC strongly recommends using only high-quality cables from reputable manufacturers to guarantee optimal noise immunity and cable longevity. Ensure that each end of the cable is fully seated into the modular connectors, and route the cable such that it is located well away from any drive input power or motor wiring. Also take care to route the cable away from any sharp edges or positions where it may be pinched.
8. Reinstall the drive's front cover / close the drive's cabinet door.
9. Repeat steps 1-8 to connect other drive(s) as needed.
10. Connect the DeviceNet network to the 5-position "Network" terminal block. Be sure to follow all published guidelines pertaining to DeviceNet network connections, layout and routing. Ensure that the terminal block is fully seated into the terminal block header, and route the network cable such that it is located well away from any electrical noise sources, such as ASD input power or motor wiring. Also take care to route the cable away from any sharp edges or positions where it may be pinched.
11. If an auxiliary power supply is going to be used, connect it to the gateway's "Power" jack.
12. Take a moment to verify that the gateway and all primary and secondary network cables have sufficient clearance from drives, motors, or power-carrying electrical wiring.

13. Turn the power sources to all connected drives ON, and verify that the drives function properly. If the drives do not appear to power up, or do not function properly, immediately turn power OFF. **Repeat steps 1 and 2 to remove all power from the drives.** Then, verify all connections. Contact ICC or your local Toshiba representative for assistance if the problem persists.

4.2.2 Installation for S7, S9, A7 and VF-nC1 ASDs

1. **CAUTION!** Verify that all input power sources to the drives to be connected have been turned OFF and are locked and tagged out.
2. **DANGER!** Wait at least 5 minutes for the drive's electrolytic capacitors to discharge before proceeding to the next step. **Do not touch any internal parts with power applied to the drive, or for at least 5 minutes after power to the drive has been removed. A hazard exists temporarily for electrical shock even if the source power has been removed.** Verify that the CHARGE LED has gone out before continuing the installation process.
3. Attach the mounting clip and gateway enclosure in your desired manner (refer to page 12 for more information).
4. Remove the drive's common serial communication port cover if it has one (refer to the appropriate drive manual for instructions how to do this). Do not discard this cover, as it should be reinstalled to minimize contamination of the port's electrical contacts if the gateway is ever disconnected from the drive.
5. Connect the drive's common serial communication port to one of the ASD channels of the gateway with the communication cable (communication cable is not included with the gateway kit). When choosing cables for this connection, standard 24 AWG category 5 (CAT5) unshielded twisted-pair (UTP) 8-conductor cables found in Ethernet networks in most office environments can be used. The maximum allowable length for these cables is 5 meters. Although there are many varieties and styles of CAT5 UTP cables available, ICC strongly recommends using only high-quality cables from reputable manufacturers to guarantee optimal noise immunity and cable longevity. Ensure that each end of the cable is fully seated into the modular connectors, and route the cable such that it is located well away from any drive input power or motor wiring. Also take care to route the cable away from any sharp edges or positions where it may be pinched.
6. Repeat steps 1, 2, 4 and 5 to connect other drive(s) as needed.
7. Connect the DeviceNet network to the 5-position "Network" terminal block. Be sure to follow all published guidelines pertaining to DeviceNet network connections, layout and routing. Ensure that the terminal block is fully

seated into the terminal block header, and route the network cable such that it is located well away from any electrical noise sources, such as ASD input power or motor wiring. Also take care to route the cable away from any sharp edges or positions where it may be pinched.

8. If an auxiliary power supply is going to be used, connect it to the gateway's “Power” jack.
9. Take a moment to verify that the gateway and all primary and secondary network cables have sufficient clearance from drives, motors, or power-carrying electrical wiring.
10. Turn the power sources to all connected drives ON, and verify that the drives function properly. If the drives do not appear to power up, or do not function properly, immediately turn power OFF. **Repeat steps 1 and 2 to remove all power from the drives.** Then, verify all connections. Contact ICC or your local Toshiba representative for assistance if the problem persists.

5. RS-485 Electrical Interface

In order to ensure appropriate network conditions (signal voltage levels, etc.), some knowledge of the gateway's RS-485 network interface circuitry is required. Refer to Figure 7 for a simplified network schematic of the secondary RS-485 interface circuitry. Note that the "Shield" terminal has no internal connection: its purpose is simply to provide a cable shield chaining location between devices. The shield is then typically connected to ground at one location only.

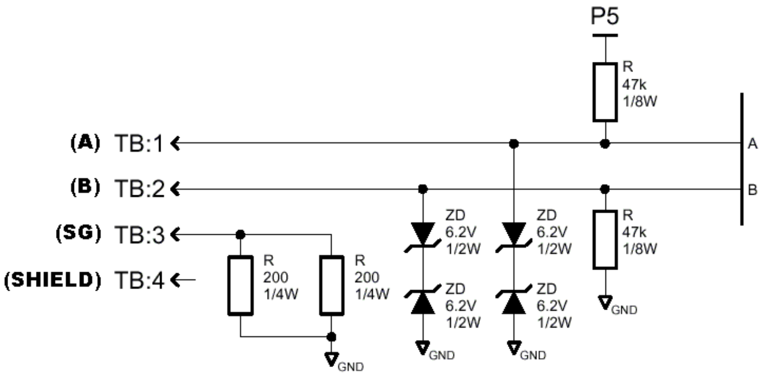


Figure 7: RS-485 Interface Circuitry Schematic

Figure 8 details the specific network connections to the RS-485 terminal block.

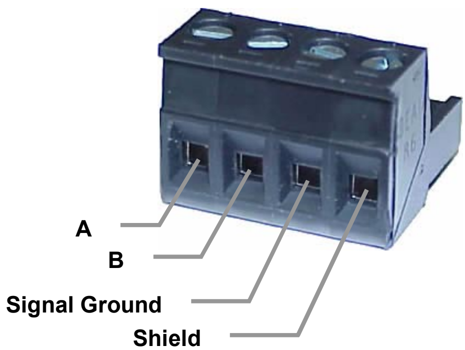


Figure 8: RS-485 Terminal Block Connections

6. Environmental Specifications

Item	Specification
Operating Environment	Indoors, less than 1000m above sea level, do not expose to direct sunlight or corrosive / explosive gasses
Operating Temperature	-10 ~ +50°C (+14 ~ +122°F)
Storage Temperature	-40 ~ +85°C (-40 ~ +185°F)
Relative Humidity	20% ~ 90% (without condensation)
Vibration	5.9m/s^2 {0.6G} or less (10 ~ 55Hz)
Main Circuit Grounding	Non-isolated, referenced to power source ground
DeviceNet Grounding	Isolated, referenced to DeviceNet network power
Cooling Method	Self-cooled

7. Maintenance and Inspection

Preventive maintenance and inspection is required to maintain the gateway in its optimal condition, and to ensure a long operational lifetime. Depending on usage and operating conditions, perform a periodic inspection once every three to six months. Before starting inspections, disconnect all power sources (with ASD connections, turn off all power supplies to connected drives and wait at least five minutes after each drive's "CHARGE" lamp has gone out.)

Inspection Points

- Check that the dust covers for all unused RJ45 ports are seated firmly in their connectors.
- If applicable, check that the ASD communication cables are fully seated in both the drive and gateway RJ45 ports. Reseat if necessary.
- Check that the network cable(s) are properly terminated in the terminal block(s), and ensure that pluggable terminal blocks are fully seated in their headers. Reseat if necessary.
- Check that there are no defects in any attached wire terminal crimp points. Visually check that the crimp points are not scarred by overheating.
- Visually check all wiring and cables for damage. Replace as necessary.
- Clean off any accumulated dust and dirt.
- If use of the gateway is discontinued for extended periods of time, apply power at least once every two years and confirm that the unit still functions properly.
- Do not perform hi-pot tests on the gateway, as they may damage the unit.

Please pay close attention to all periodic inspection points and maintain a good operating environment.

8. Storage and Warranty

8.1 Storage

Observe the following points when the gateway is not used immediately after purchase or when it is not used for an extended period of time.

- Avoid storing the unit in places that are hot or humid, or that contain large quantities of dust or metallic dust. Store the unit in a well-ventilated location.
- When not using the unit for an extended period of time, apply power at least once every two years and confirm that it still functions properly.

8.2 Warranty

The gateway is covered under warranty by ICC, Inc. for a period of 12 months from the date of installation, but not to exceed 18 months from the date of shipment from the factory. For further warranty or service information, please contact Industrial Control Communications, Inc. or your local distributor.

9. LED Indicators

The gateway contains several different LED indicators, each of which conveys important information about the status of the unit and connected networks. These LEDs and their functions are summarized here.

9.1 ASD Port Indicators

Each ASD port RJ45 connector contains two integrated green LEDs. Figure 9 indicates the functions of these LEDs.

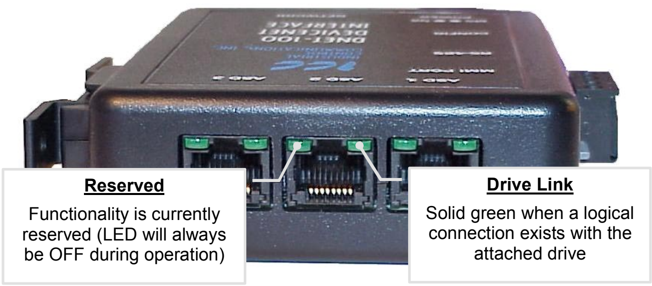


Figure 9: Drive Connector Indicators

The Drive Link indicator provides an easy method of determining that the gateway and drive are successfully exchanging data, independent of primary network activity (Note: Drive Link LED will be OFF if no points are defined for that channel, even if a drive is physically connected to the port).

9.2 MMI Port Indicators

The MMI port RJ45 connector also contains two integrated green LEDs. Figure 10 indicates the functions of these LEDs.

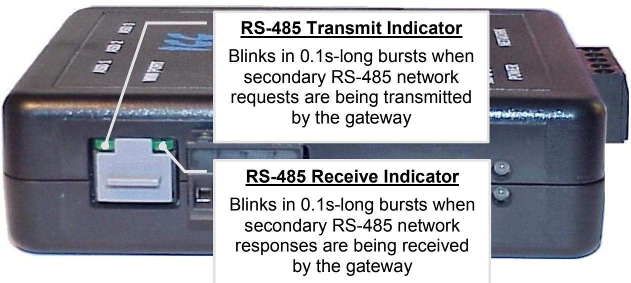


Figure 10: MMI Port Indicators

9.3 DeviceNet Indicators

The standard bicolor DeviceNet Module Status (MS) and Network Status (NS) LEDs are supported as indicated in Figure 11. Behavior is as specified in the ODVA DeviceNet Specifications.

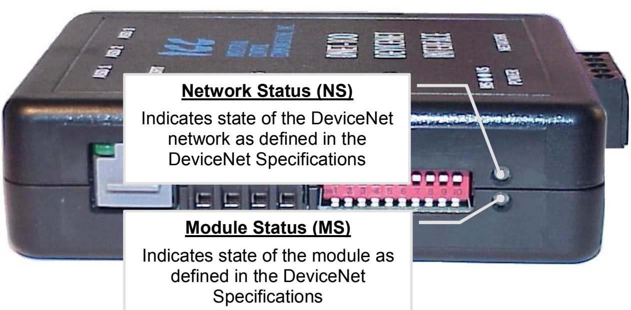


Figure 11: DeviceNet Indicators

10. Configuration Switches

There are ten configuration DIP switches located on the front side of the gateway. Switches #1 - #6 set the DeviceNet MAC ID of the gateway (refer to Table 1).

Table 1: DeviceNet MAC ID Assignment

SW1	SW2	SW3	SW4	SW5	SW6	MAC ID	SW1	SW2	SW3	SW4	SW5	SW6	MAC ID
OFF	OFF	OFF	OFF	OFF	OFF	**0**	OFF	OFF	OFF	OFF	OFF	ON	**32**
ON	OFF	OFF	OFF	OFF	OFF	**1**	ON	OFF	OFF	OFF	OFF	ON	**33**
OFF	ON	OFF	OFF	OFF	OFF	**2**	OFF	ON	OFF	OFF	OFF	ON	**34**
ON	ON	OFF	OFF	OFF	OFF	**3**	ON	ON	OFF	OFF	OFF	ON	**35**
OFF	OFF	ON	OFF	OFF	OFF	**4**	OFF	OFF	ON	OFF	OFF	ON	**36**
ON	OFF	ON	OFF	OFF	OFF	**5**	ON	OFF	ON	OFF	OFF	ON	**37**
OFF	ON	ON	OFF	OFF	OFF	**6**	OFF	ON	ON	OFF	OFF	ON	**38**
ON	ON	ON	OFF	OFF	OFF	**7**	ON	ON	ON	OFF	OFF	ON	**39**
OFF	OFF	OFF	ON	OFF	OFF	**8**	OFF	OFF	OFF	ON	OFF	ON	**40**
ON	OFF	OFF	ON	OFF	OFF	**9**	ON	OFF	OFF	ON	OFF	ON	**41**
OFF	ON	OFF	ON	OFF	OFF	**10**	OFF	ON	OFF	ON	OFF	ON	**42**
ON	ON	OFF	ON	OFF	OFF	**11**	ON	ON	OFF	ON	OFF	ON	**43**
OFF	OFF	ON	ON	OFF	OFF	**12**	OFF	OFF	ON	ON	OFF	ON	**44**
ON	OFF	ON	ON	OFF	OFF	**13**	ON	OFF	ON	ON	OFF	ON	**45**
OFF	ON	ON	ON	OFF	OFF	**14**	OFF	ON	ON	ON	OFF	ON	**46**
ON	ON	ON	ON	OFF	OFF	**15**	ON	ON	ON	ON	OFF	ON	**47**
OFF	OFF	OFF	OFF	ON	OFF	**16**	OFF	OFF	OFF	OFF	ON	ON	**48**
ON	OFF	OFF	OFF	ON	OFF	**17**	ON	OFF	OFF	OFF	ON	ON	**49**
OFF	ON	OFF	OFF	ON	OFF	**18**	OFF	ON	OFF	OFF	ON	ON	**50**
ON	ON	OFF	OFF	ON	OFF	**19**	ON	ON	OFF	OFF	ON	ON	**51**
OFF	OFF	ON	OFF	ON	OFF	**20**	OFF	OFF	ON	OFF	ON	ON	**52**
ON	OFF	ON	OFF	ON	OFF	**21**	ON	OFF	ON	OFF	ON	ON	**53**
OFF	ON	ON	OFF	ON	OFF	**22**	OFF	ON	ON	OFF	ON	ON	**54**
ON	ON	ON	OFF	ON	OFF	**23**	ON	ON	ON	OFF	ON	ON	**55**
OFF	OFF	OFF	ON	ON	OFF	**24**	OFF	OFF	OFF	ON	ON	ON	**56**
ON	OFF	OFF	ON	ON	OFF	**25**	ON	OFF	OFF	ON	ON	ON	**57**
OFF	ON	OFF	ON	ON	OFF	**26**	OFF	ON	OFF	ON	ON	ON	**58**
ON	ON	OFF	ON	ON	OFF	**27**	ON	ON	OFF	ON	ON	ON	**59**
OFF	OFF	ON	ON	ON	OFF	**28**	OFF	OFF	ON	ON	ON	ON	**60**
ON	OFF	ON	ON	ON	OFF	**29**	ON	OFF	ON	ON	ON	ON	**61**
OFF	ON	ON	ON	ON	OFF	**30**	OFF	ON	ON	ON	ON	ON	**62**
ON	ON	ON	ON	ON	OFF	**31**	ON	ON	ON	ON	ON	ON	**63**

Switches #7 and #8 are used to set the DeviceNet network baud rate as indicated in Table 2.

Table 2: DeviceNet Network Baud Rate Selection

SW7	SW8	Network Baud Rate
OFF	OFF	125 kbps
ON	OFF	250 kbps
OFF	ON	500 kbps
ON	ON	

Switch #9 is currently reserved, and switch #10 is used during flash firmware reprogramming of the gateway (refer to section 15).

Note that the “ON” position of each switch is the “down” position and that the “OFF” position is the “up” position. Refer to the indicator markings on the switch.

The MAC ID and configured baud rate are read by the DNET-100 only on power-up or after a reset. Therefore, if either of these selections is changed be sure to either power the unit off momentarily by disconnecting it from all power sources, or perform a soft reset on the unit by entering and then exiting the configuration console or by issuing a RESET service to the Identity Object.

11. Internal Battery

The gateway has an internal coin-cell type battery that is used to backup the file system and maintain the real-time clock when the gateway is unpowered. This battery is designed to last the lifetime of the product under normal use. However, if the gateway is left unpowered for several years, the battery may become exhausted. For this reason, always be certain to download any customized point files to a PC so that they will be available for uploading again if the battery fails and requires replacement.

If the battery becomes discharged, contact ICC for assistance in obtaining a replacement. Alternatively, it can be replaced by the user by removing all power sources from the gateway, opening the case, carefully popping out the discharged battery and replacing it with a Panasonic BR1632 or equivalent component.

12. Point Configuration

As mentioned in section 1, the Network Gateway Series concept revolves around a central “point database”, containing various individual points. A “point” is simply an object that defines some sort of primary -to- secondary network mapping information. In the case of the DNET-100, a point is simply a DeviceNet parameter object, whose characteristics (attributes) are entered by the user via the serial console. Throughout the remainder of this manual, therefore, configured points may also be referenced by their more naturally-associated terms “parameters”, “parameter objects”, or “DeviceNet parameters”. Up to a total of 100 individual parameters can be defined, and they can be allocated as necessary to any secondary-network device and contained data item.

The information that must be entered by the user to define the characteristics of a parameter can be divided into two subsets: that information required to map parameter objects to their appropriate secondary-network device and contained data item, and that information required to conveniently define and access the parameter via the DeviceNet network (i.e. to generate an Electronic Data Sheet (EDS) and access the parameter via a network configuration tool, such as Rockwell Software’s *RSNetWorx For DeviceNet*).

The required mapping information includes the secondary-network device’s station number (or ASD port number in the case of an ASD common serial secondary network), the secondary network data item (register number, parameter number etc.) residing in that device, and the DeviceNet parameter object instance (or “parameter number”). The mapping information is required to provide access to the targeted secondary network data item when the parameter is accessed via explicit messaging, or when the parameter is included in one of the available I/O assembly objects and accessed via the polled or COS/cyclic I/O connections.

The parameter definition information includes such items as the parameter’s data type, name, help string, minimum, maximum and default values, scaling factors and decimal precision. Considerations are also included to provide a parameter-specific timeout value to be written to the parameter’s associated secondary network object in the event of a DeviceNet network timeout. In general, parameter definition information has no bearing on the normal operation of the gateway (i.e. communication with a scanner or other master device): it exists only to create a customized EDS when configuration is complete, and to be used by a network configuration tool to facilitate proper data display and entry methods when accessed via the explicit messaging connection.

12.1 Parameter Configuration

As previously mentioned, each data item residing on secondary-network devices must be mapped to a unique DeviceNet parameter object to allow access via the DeviceNet network. This access may take place directly via explicit messaging, or indirectly via I/O messaging. These secondary-network data items are collectively referred to as **objects**. The definition of what constitutes an object varies depending on the secondary-network protocols and devices involved. For example, an object on a Modbus RTU secondary network is simply a Modbus holding register, and on a Toshiba ASD secondary network is a drive parameter (configuration parameters, control parameters and status parameters are all handled the same by the gateway). Once the mapping is performed, the DeviceNet master or configuration tool can access the secondary-network object by simply accessing (typically via explicit messaging for a configuration tool and via I/O messaging for a scanner) the configured DeviceNet parameter.

This can perhaps best be demonstrated by use of an example. Say, for instance, that a DeviceNet configuration tool (such as *RSNetWorx For DeviceNet*) would like to gain access to four Modbus RTU devices. The Modbus devices have been pre-assigned the addresses 5, 7, 9 and 11. This system is represented in Figure 12.

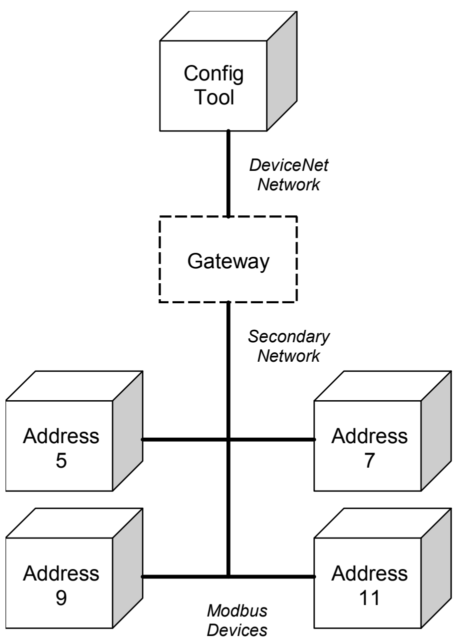


Figure 12: Example System

In order to allow the tool to access the Modbus devices, we must define a DeviceNet parameter for each of the objects (secondary network Modbus registers) that we wish to access. Let's assume that the data shown in Table 3 is to be accessed on each of the respective Modbus devices, and that the data's characteristics are as indicated.

Table 3: Example Secondary-Network Data

Modbus Address	Modbus Register	Note
5	10	Frequency command (1=0.01Hz)
"	15	Operating frequency (1=0.01Hz)
"	120	Run/Stop command (run=0x0080)
"	125	Run/Stop status (running=0x0080)
7	2	Temperature sensor (1=0.1C)
"	4	Digital output (ON=0x0001)
9	8	Voltage monitor #1 (1=1v)
"	9	Voltage monitor #2 (1=1v)
"	10	Voltage monitor #3 (1=1v)
11	8	Voltage monitor #1 (1=1v)
"	9	Voltage monitor #2 (1=1v)
"	10	Voltage monitor #3 (1=1v)

From this table we notice that in total 12 DeviceNet parameters must be created (one for each Modbus register to be accessed). By definition, DeviceNet parameter numbers start at 1, sequentially increasing thereafter. For the time being, we will ignore the additional gateway configuration required to assign these parameters to be members of I/O assembly objects, and focus simply on their existence and access via a configuration tool. Let's begin by creating our first DeviceNet parameter, which will map to Modbus register 10 ("frequency command") on Modbus address 5. Via the DNET-100's console, we can add a new point, and configure it as follows:

DeviceNet parameter............................ 1 (automatically assigned)
Modbus RTU ID.................................... 5
Modbus RTU register number 10
Name string .... "Freq command"
Help string .... "FC command value"
Units string.. "Hz"
Data Type .... UINT
Read Only... N
Max Value... 8000
Min Value.. 0
Default Enable .... N
Default Value 0
Allow Scaling .... Y
Multiplier 1
Divisor.. 100
Offset 0
Precision... 2

Don’t worry if you don’t understand the meanings of all of the fields listed above at this point: their significance will be explained in detail later during the console configuration portion of this manual. In a similar fashion to parameter #1, we can enter the remainder of the parameters (#2 - #12) to correspond to the secondary network architecture provided in Table 3.

While the mapping function provided by configured parameters may be obvious, there is another less-apparent service that they also provide. This service is termed **data mirroring**, whereby current copies of secondary network object values are maintained locally within the gateway itself. This greatly reduces the primary network’s request-to-response latency time, as read and write requests can be entirely serviced locally, thereby eliminating the time required to execute a secondary network transaction.

Another advantage afforded by the ability to map secondary network objects to any available DeviceNet parameter number is the capability of **data reorganization**. Data reorganization allows the grouping of secondary network objects into more logical or efficient patterns. Because the DeviceNet network tool or scanner never “sees” the true secondary network addresses or object indexes (i.e. register numbers), the secondary network address/object assignment can be determined by any user-defined criteria (physical unit position on the floors of a building, for example), while allowing the DeviceNet parameter assignments to be chosen using a different criteria (grouping according to device application or function, for example). For instance, if three ASDs were connected to a DNET-100 gateway, parameters #1, #2 and #3 could be assigned as the frequency commands of ASD #1, ASD #2 and ASD #3, respectively.

Once the attributes of each parameter have been entered, the final results of the overall assignment are given in Table 4. The information residing on the Modbus devices can now be accessed via standard DeviceNet parameter access methods.

Table 4: Final Parameter Assignment Example

DeviceNet Parameter	Modbus Address/ Register	Note
1	5 / 10	Frequency command
2	5 / 15	Operating frequency
3	5 / 120	Run/Stop command
4	5 / 125	Run/Stop status
5	7 / 2	Temperature sensor
6	7 / 4	Digital output
7	9 / 8	Voltage monitor #1
8	9 / 9	Voltage monitor #2
9	9 / 10	Voltage monitor #3
10	11 / 8	Voltage monitor #1
11	11 / 9	Voltage monitor #2
12	11 / 10	Voltage monitor #3

12.2 I/O Assemblies

Now that we have been exposed to the concepts of parameter mapping and access, let's further expand upon this concept to include the configuration of I/O assemblies. The DNET-100 supports four I/O assembly objects, whose instance numbers are defined as follows:

Polled I/O output assembly............................instance #100 (0x64)
Polled I/O input assembly..............................instance #150 (0x96)
COS/cyclic I/O output assembly....................instance #101 (0x65)
COS/cyclic I/O input assembly......................instance #151 (0x97)

The sizes and member lists of these assembly objects are entirely user-configurable, and the configuration of each assembly object is independent of the others. The assembly sizes (consumed data for output assemblies and produced data for input assemblies) are selectable from 0 to 200 bytes, in 2-byte increments. The reason for the 2-byte increment restriction is due to the fact that all secondary-network data object values for protocols supported by the DNET-100 are 16 bits in size. Any valid DeviceNet parameter currently defined in the gateway can be included in the member list of any of the I/O assemblies.

To see how this works, we will continue our example network that we started in the previous section. Now, however, we are interested in adding DeviceNet scanner access to the 12 parameters that we previously defined. First, we need to determine which parameters are command-oriented (parameters that we will write to with the intent on performing some action) and which are status-oriented (parameters that we will monitor with the intent of determining a data object's status). From Table 4, we can see that parameters 1, 3 and 6 are command-oriented, and the rest are status-oriented.

Our next decision is to determine which I/O assemblies we will use (poll, COS, cyclic, poll+COS or poll+cyclic). This decision is typically based on the specific nature of each application, and must be determined by the person performing the network configuration. For this example, we will use Polled I/O only, and will therefore only need to configure the characteristics of assembly instances 100 and 150.

To determine the required sizes of the I/O assembly instances, we can recognize the fact that the "value" attributes of all DNET-100 parameters are 16 bits (2 bytes) in length. This results in the following formula:

Number of parameters in member list x 2 = size of assembly in bytes

For assembly instance 100 (our command assembly), therefore, we can use the above equation with our previous determination of having 3 command-oriented parameters to arrive at a consumed data size of 6 bytes. Similarly, the produced data size for assembly instance 150 can be calculated to be 18 bytes. These size definitions are then entered into the DNET-100's console. Note that in this example we have chosen to include all available parameters as members of I/O assemblies. There is no requirement to do this, however: it is perfectly acceptable to define a stand-alone parameter which is not a member of any assembly object definition, and is therefore only accessible via normal parameter object access methods (i.e. explicit messaging).

Note that during I/O data exchanges, if the actual consumed data size is less than or equal to a connection instance's configured consumed connection size, then all received data will be consumed and the connection will produce normally. If the actual consumed data size is larger than the connection instance's configured consumed connection size, however, the consumed data will be ignored and the connection will not produce.

The last I/O assembly configuration detail requiring discussion is the member list definitions and the assignment of the offsets within each assembly instance. Each assembly instance can be viewed as a contiguous array of bytes, the size of which is dependent on the number of constituent member parameters (6 bytes and 18 bytes, respectively, in our example). Including a parameter in an assembly member list allows us to access that parameter via I/O messaging, and is simply a function of assigning the parameter number to an offset (an assembly object array starting position). Because all parameters are 16-bit values, valid offsets range from 0, 2, 4...198. For example, after defining our consumed data size for assembly instance 100 to be 6 bytes, the initial (default) member list and related offset assignments will be as shown in Table 5.

Table 5: Initial Example Assembly Instance Definition (Instance 100)

Offset	Member Parameter	Note
0	0	N/A
1		N/A
2	0	N/A
3		N/A
4	0	N/A
5		N/A

Note that the member parameter for each offset group is 0, which means "not assigned". If a 0 exists in an output (command) assembly member list, then the consumed data in that position will be ignored. If a 0 exists in an input (status) assembly member list, then the produced data in that position will always be "0".

For simplicity, we will assign our command-oriented parameters 1, 3 and 6 to reside at output assembly instance offsets 0, 2 and 4, respectively. Any arrangement of these three parameters within the three available member list positions would be valid, however. After making these member list assignments, the initial assembly object data array given in Table 5 is then updated as indicated in Table 6 below:

Table 6: Final Example Assembly Instance Definition (Instance 100)

Offset	Member Parameter	Note
0	1	Frequency command LO byte
1		Frequency command HI byte
2	3	Run/Stop command LO byte
3		Run/Stop command HI byte
4	6	Digital output LO byte
5		Digital output HI byte

In a similar way, we can define the member list of the 18-byte long produced data array for input (status) assembly instance 150 as indicated in Table 7.

Table 7: Final Example Assembly Instance Definition (Instance 150)

Offset	Member Parameter	Note
0	2	Operating frequency LO byte
1		Operating frequency HI byte
2	4	Run/Stop status LO byte
3		Run/Stop status HI byte
4	5	Temperature sensor LO byte
5		Temperature sensor HI byte
6	7	Voltage monitor #1 LO byte
7		Voltage monitor #1 HI byte
8	8	Voltage monitor #2 LO byte
9		Voltage monitor #2 HI byte
10	9	Voltage monitor #3 LO byte
11		Voltage monitor #3 HI byte
12	10	Voltage monitor #1 LO byte
13		Voltage monitor #1 HI byte
14	11	Voltage monitor #2 LO byte
15		Voltage monitor #2 HI byte
16	12	Voltage monitor #3 LO byte
17		Voltage monitor #3 HI byte

Once this configuration is complete, we will be able to send command information to, and read status information from, the Modbus devices residing on the DNET-100's secondary network. If desired, we could have also chosen to utilize the COS/cyclic I/O connection, either instead of the polled I/O connection or in conjunction with it. In some instances, it may be convenient to assign different parameters to the polled and COS/cyclic assembly definitions, and then allocate both connections via the network master. This combination is useful when a master wants to poll the device for some inputs every scan cycle, and receive different inputs (such as slowly-changing temperatures, for example) at a slower rate via the COS/cyclic connection.

12.3 Network Timeout Settings

The gateway can be configured to perform a specific set of actions when DeviceNet communications are lost. A loss of DeviceNet communications can be due to several different events, such as a connection timer (expected packet rate) time-out, a CAN busoff event, or loss of DeviceNet network power.

During the parameter definition phase of the DNET-100's configuration, the user is prompted for a "Default Enable" selection. The default value of this selection is "N", in which case the parameter being defined does not have the ability to participate in timeout processing. If the user enters "Y", however, the "Default Value" attribute of the parameter being configured serves a dual purpose. While it is still used to generate the "default value" field in the EDS, this default value will also be used as the timeout value that can optionally be written to the parameter in the event of a DeviceNet network timeout.

The item which determines when and how "default value" timeout processing will take place is the "Timeout Mode" selection found in the DNET-100's Main Menu > Points > DeviceNet Setup menu. Possible values for the Timeout Mode parameter are 0-3, with the following meanings:

0 ...... Take no action (ignore the timeout). A network timeout will not result in any parameter value modification.

1 ...... Write the Default Values to those points that are members of the polled I/O output assembly that have their Default Enable attributes set to "Y". For example, if parameter object #1 has its Default Enable set to "Y", its Default Value set to 10, the Timeout Mode is set to 1, and parameter #1 is a member of the polled I/O output assembly object definition (assembly instance 100), then when a network timeout occurs, a value of 10 will be written to the secondary-network data object defined in parameter object #1's configuration.

2 ...... Write the Default Values to those points that are members of the COS/cyclic IO output assembly that have their Default Enable attributes set to "Y". This is similar to setting "1" above, except that it affects only those parameters that are members of the COS/cyclic I/O output assembly object definition (assembly instance 101).

3 ...... Write the Default Values to all points that have their Default Enable attributes set to "Y". This setting is independent of a parameter's membership in any assembly instances.

Note that Timeout Mode settings 1 and 2 above affect those parameters that are simply defined to be members of assembly instances 100 and 101, respectively. Whether or not the given assembly instance is in use at the moment the timeout occurs is irrelevant. For example, if parameter object #1 has its Default Enable set to "Y", its Default Value set to 10, and it is a member of the polled I/O output assembly object definition (assembly instance 100), then if the Timeout Mode is set to 1, it does not matter whether the polled I/O connection or COS/cyclic connection (or neither) was allocated at the moment of network timeout: parameter object #1 will still be written with its Default

Value, while those parameter objects that are exclusively members of assembly instance 101 (the COS/cyclic output assembly) will not receive timeout processing regardless of their Default Enable settings.

This combination of parameter-specific Default Enable and global Timeout Mode settings allow a relatively complex and specific set of "fail-safe" behaviors to take place when unexpected failure of the DeviceNet network occurs.

12.4 General Configuration Procedure

Now that we have had a brief tutorial on parameter and assembly object assignment and configuration, we can summarize the general overall gateway configuration process as follows:

1. Enter the console (stops all network communication tasks)
2. Define secondary serial communication settings (physical layer, protocol and network characteristics)
3. Create DeviceNet parameter objects
4. Assign parameter object memberships to the I/O assembly instances
5. Save the newly-created point database to the gateway's file system, and download a copy to your PC for backup purposes
6. Download the customized EDS file for registration in your network configuration tool
7. Exit the console (resets the gateway)

Of course, it is possible to simplify or even eliminate some of these steps by starting your configuration from a pre-existing point database file (either previously-created or downloaded from the internet), and then simply modifying those elements necessary to match your application.

13. Console Access

As mentioned in section 1, the gateway's functionality is entirely controlled by a "point database" that is user-modifiable. The method of accessing this database is via a text-based console interface over an RS232 connection to a computer's serial (COM) port. This connection is performed by using the included DB9-RJ45 cable to connect the gateway's MMI port to the computer's serial port.

13.1 Requirements

All that is needed is a computer with a standard serial (COM) port, some sort of communications software (such as HyperTerminal, included with Microsoft Windows operating systems), and the included MMI cable (ICC part number 10425). Any communications software and PC will work, provided they support ASCII communications at 38.4kbaud.

13.2 Connection

The gateway ships from the factory with a dust cover installed in the MMI port. To minimize contamination of the port's electrical contacts, keep this dust cover in place whenever the MMI port is not in use.

Connect the RJ45 end of the MMI cable to the MMI port, and connect the other end to the computer's serial port. Ensure that the gateway has a power source connected to it.

13.3 Application Configuration

As previously mentioned, any PC communication software and PC serial port can be used. The software configuration example given here will be for Windows HyperTerminal communicating via COM1.

Figure 13 shows the "Connect To" tab of the properties window for COM1. Figure 14 shows the window that appears when "Configure" is selected in the "Connect To" tab. Figure 15 shows the "Settings" tab of the properties window. Most of these settings are their default values: usually the only changes needed are the "Bits per second" and possibly "Flow control" settings shown in Figure 14.

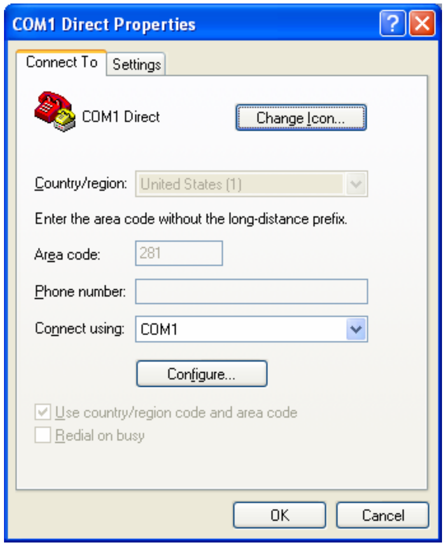


Figure 13: HyperTerminal Configuration Screen #1

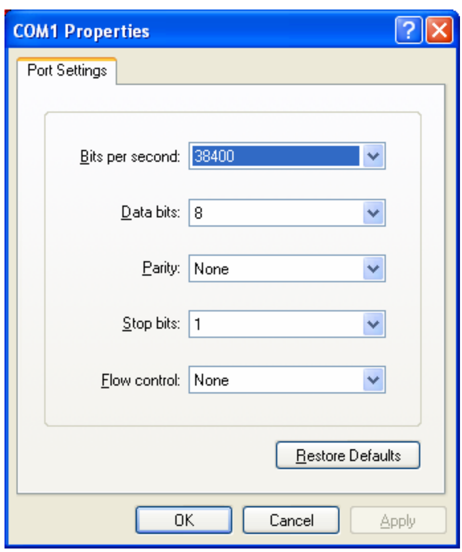


Figure 14: HyperTerminal Configuration Screen #2

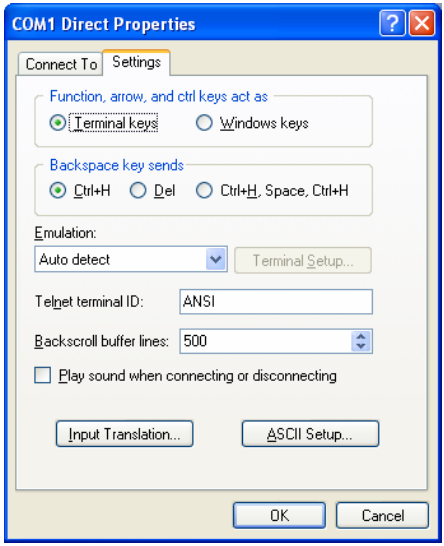


Figure 15: HyperTerminal Configuration Screen #3

13.4 Invocation

The console provides standard access and editing methods for the various configuration items (points and their associated attributes). It is important to note that unless otherwise indicated, any modifications made to the point database will become effective immediately. However, these changes will only be permanently retained when the current database is saved to a file location: if a change is made to the database and then the gateway is reset without saving those changes, then the active file will be restored upon initialization, overwriting the unsaved changes.

To enter the console, simply type "`menu`" and press the Enter key. You will then be notified that all communication tasks will be terminated for the duration of the editing (refer to Figure 16). It is important to ensure that all connected devices are in a safe state such that loss of communications will not pose a danger to equipment or personnel. Exiting the console will reset the gateway and restart network communications using the currently-active database file.

At most console prompt locations, typing "`x`" will return you to the previous menu, and typing "`menu`" will return you to the main menu. Also note that console commands are not case-sensitive.

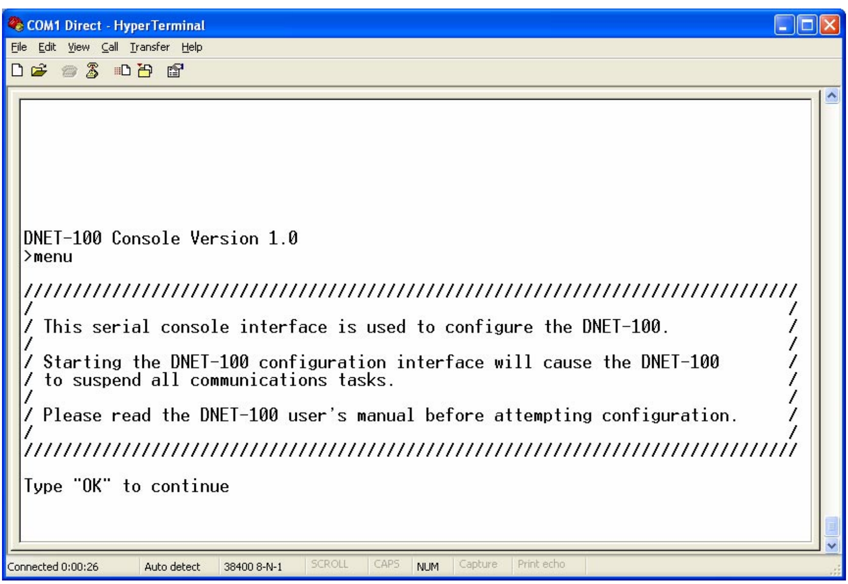


Figure 16: Starting the Console

13.5 Main Menu

The main menu is shown in Figure 17. All gateway configuration is performed by “drilling down” into progressively lower-level menus.

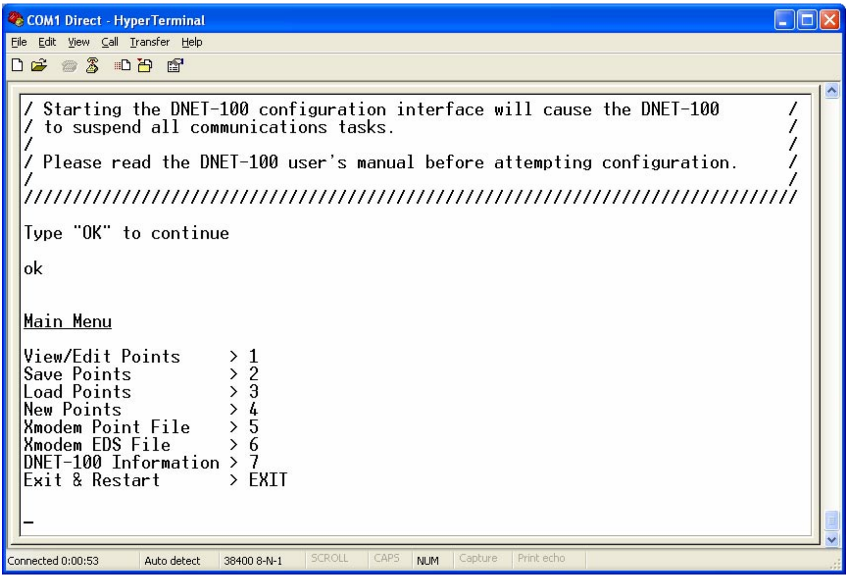


Figure 17: Console Main Menu

All navigation and data entry commands are input by simply entering the menu selection number to the right of the “>” symbol along with any required data fields at the console prompt. In Figure 17, for example, entering the menu selection number “1” (without the quotation marks) will bring up the View/Edit Points submenu. Throughout this manual, example console entry strings will be provided enclosed in quotation marks to delineate them from the description text: whenever actually entering the console strings, however, do not include the quotation marks.

When additional data fields are required with a data entry command, they will be indicated by square brackets (“[…]”) after the menu selection number. All data entry commands and data fields must be separated by spaces. Because data entry commands and data fields are delineated by spaces, they are therefore not allowed within data fields (such as name strings). In these cases, it is usually convenient to use an underscore “_” in place of a space. For example, attempting to enter a point’s name as “ASD1 output freq” would result in an error, but “ASD1_output_freq” would be perfectly acceptable.

13.5.1 View/Edit Points

Main menu selection number 1 displays a screen which shows a summary of the current point (parameter) configuration (see Figure 18). This screen only displays the point mapping information: in order to access a point's DeviceNet definition information, menu selection number 1 "View/Edit a Point" must be entered with the additional argument of the targeted point number.

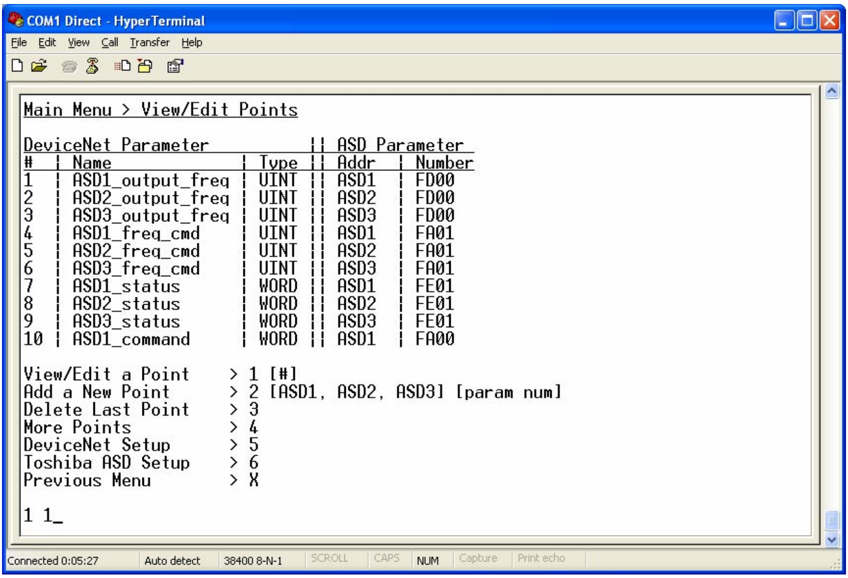


Figure 18: View/Edit Points

13.5.1.1 View/Edit a Point

Entering "1" with a point number (such as "`1 1`", as shown at the bottom of Figure 18) at the View/Edit Points submenu will display and allow editing of the point's mapping and DeviceNet definition information. Refer to Figure 19 for an example. Although the number of menu selections in this submenu will remain consistent, the semantics of the first menu selection (the point mapping information) will vary slightly depending on the currently-defined secondary network. For example, if a Modbus secondary network is currently selected, then the first menu selection will display something to the effect of "`Modbus RTU Reg = ID1, 1`", which indicates that the current point is mapped to Modbus slave ID1, holding register 1.

Whenever a new point is created (refer to section 13.5.1.2), all of the point configuration information is set to default values. One must therefore navigate to the View/Edit a Point submenu for that point in order to modify the DeviceNet configuration information.

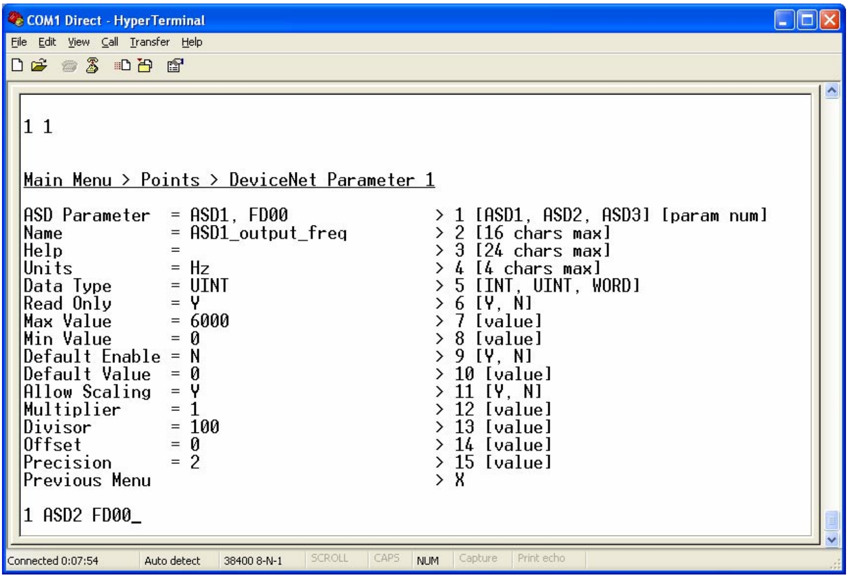


Figure 19: View/Edit a Point

Mapping Information: Line 1 indicates the current point mapping information. In Figure 19, it can be seen that DeviceNet Parameter 1 maps to ASD1, parameter FD00 (the ASD's output frequency). To change the mapping information, enter menu selection number 1 with the additional arguments of the device on which the data object resides and the data object index. For example, the bottom of Figure 19 shows an example of changing DeviceNet parameter 1's mapping to ASD2 (the device on which the data object resides), ASD parameter FD00 (the data object index). Again, the semantics of the menu prompt and mapping modification entry string will vary depending on the secondary network. A similar line 1 menu prompt when a Modbus secondary network is chosen would be displayed as "`> 1 [ID num] [reg num]`", and its corresponding mapping modification entry string would therefore be something to the effect of "`1 3 5`", which would map the currently-selected DeviceNet parameter to Modbus device ID #3, holding register #5.

Note that the entry and display radix of the secondary network data object depends on the chosen secondary network. For example, entering a "param num" of 10 when the Toshiba ASD secondary network is selected will map the DeviceNet parameter to ASD parameter 0x10 (16_{10}). However, entering a "reg num" of 10 when the Modbus secondary network is selected will map the DeviceNet parameter to holding register 10_{10} (0x0A). These radices are chosen based on the "natural radix" defined for each secondary-network protocol. For more information on the natural radices of the available secondary networks, refer to section 14.2.

Name: Enter menu selection number 2 with a 16-character (max) string for the parameter's name. This field is used only for EDS file generation. If more than

16 characters are entered, truncation will take place. An example of entering a name would be “2 ASD1_output_freq”.

Help: Enter menu selection number 3 with a 24-character (max) string for the parameter’s help string. This field is used only for EDS file generation. If more than 24 characters are entered, truncation will take place. An example of entering a help string would be “3 The_operating_frequency”.

Units: Enter menu selection number 4 with a four-character (max) string for the parameter’s engineering units string. This field is used only for EDS file generation. If more than four characters are entered, truncation will take place. An example of entering a units string of “%” would be “4 %”.

Data Type: Enter menu selection number 5 with the chosen data type for the parameter’s raw data. This field is used only for EDS file generation. Three data types are supported: INT (-32768 ~ 32767), UINT (0 ~ 65535) and WORD (bit string – 16 bits). An example of entering a data type would be “5 uint”.

Read Only: Enter menu selection number 6 with the designation of whether or not this parameter is read only (i.e. a status parameter). This field is used only for EDS file generation. An example of designating a parameter to be read/write capable would be “6 N”.

Max Value: Enter menu selection number 7 with the maximum parameter value. Note that this value must be within the allowable range of the selected data type. For parameters of type WORD, this value should be set to 65535 (0xFFFF). An example of entering a maximum value of 40000 for a parameter of type UINT would be “7 40000”.

Min Value: Enter menu selection number 8 with the minimum parameter value. Note that this value must be within the allowable range of the selected data type. For parameters of type WORD, this value should be set to 0. An example of entering a minimum value of -10 for a parameter of type INT would be “8 -10”.

Default Enable: Enter menu selection number 9 with the designation of whether or not this parameter has its Default Value enabled as its network timeout value. Refer to section 12.3 for a detailed explanation of network timeout settings. An example of disabling this parameter’s timeout processing capabilities would be “9 N”.

Default Value: Enter menu selection number 10 with the default parameter value. If this parameter’s Default Enable selection is set to “Y”, then the default value also doubles as this parameter’s timeout value, otherwise this field is used only for EDS file generation. Refer to section 12.3 for a detailed explanation of network timeout settings. An example of entering a default value of 1000 would be “10 1000”.

Allow Scaling: Enter menu selection number 11 with the designation of whether or not this parameter should be presented to the user in its engineering value. This field is used only for EDS file generation. If scaling is allowed, then network configuration tools such as *RSNetWorx* will typically calculate the engineering value via Equation 1:

$$\text{Engineering Value} = \frac{(\text{Actual Value} + \text{Offset}) \times \text{Multiplier}}{\text{Divisor}} \qquad (\textit{Equation 1})$$

The engineering value can then be displayed to the user in the terms specified within the Precision (menu selection number 15). For example, if a DeviceNet parameter maps to an adjustable speed drive's frequency command value, where an actual value of 0 ~ 6000 represents 0.00Hz ~ 60.00Hz, then typical scaling values for use in Equation 1 would be:

Offset........... 0
Multiplier...... 1
Divisor 100
Precision 2

An example of allowing scaling would be "11 Y".

Multiplier: Enter menu selection number 12 with a multiplier value. Valid values are 0 ~ 65535. This field is used only for EDS file generation. For typical application of the multiplier value, refer to Equation 1. An example of setting the multiplier to 1 would be "12 1".

Divisor: Enter menu selection number 13 with a divisor value. Valid values are 0 ~ 65535. This field is used only for EDS file generation. For typical application of the divisor value, refer to Equation 1. An example of setting the divisor to 100 would be "13 100".

Offset: Enter menu selection number 14 with an offset value. Valid values are -32768 ~ 32767. This field is used only for EDS file generation. For typical application of the offset value, refer to Equation 1. An example of setting the offset to -100 would be "14 -100".

Precision: Enter menu selection number 15 with a precision value. Valid values are 0 ~ 255. This field is used only for EDS file generation. The precision specifies the number of decimal places to use when displaying the scaled engineering value. An example of setting the precision to 2 would be "15 2".

13.5.1.2 Add a New Point

To add a new point to the configuration, enter menu selection number 2 with the additional arguments of the device on which the data object resides and the data object index. The DeviceNet parameter number of the new point will automatically be assigned as the next sequential free parameter number. For example, the bottom of Figure 20 shows an example of adding a new point to map to ASD2 (the device on which the data object resides), ASD parameter FE07 (the data object index). This new point will automatically be assigned DeviceNet parameter number 4. As mentioned previously, the semantics of the menu prompt and new point entry string will vary depending on the secondary network. A similar menu prompt when a Modbus secondary network is chosen would be displayed as "`> 2 [ID num] [reg num]`", and its corresponding new point entry string would therefore be something to the effect of "`1 3 15`", which would add a point that maps a DeviceNet parameter to Modbus device ID #3, holding register #15.

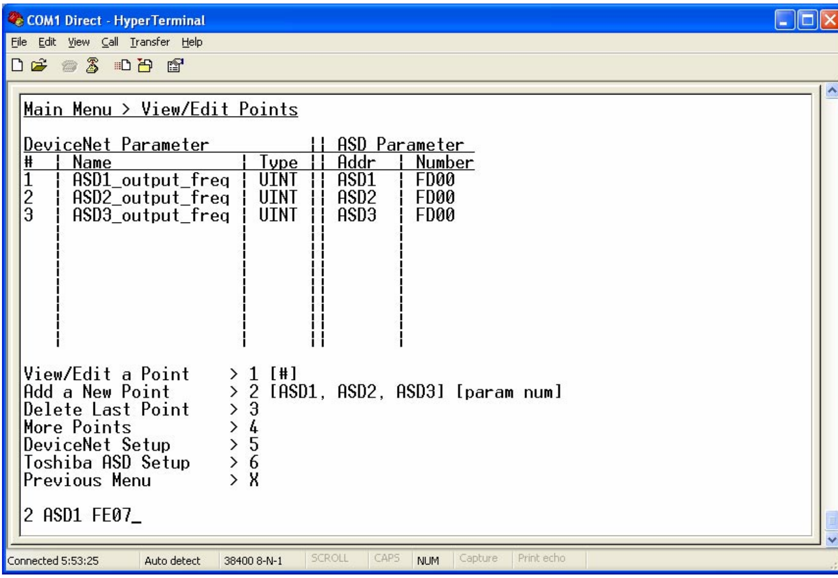


Figure 20: Adding a New Point

Note that the entry and display radix of the secondary network data object depends on the chosen secondary network. For example, entering a "param num" of 10 when the Toshiba ASD secondary network is selected will map the DeviceNet parameter to ASD parameter 0x10 (16_{10}). However, entering a "reg num" of 10 when the Modbus secondary network is selected will map the DeviceNet parameter to holding register 10_{10} (0x0A). These radices are chosen based on the "natural radix" defined for each secondary-network protocol. For more information on the natural radices of the available secondary networks, refer to section 14.2.

Once the new point has been added to the point list, its attributes must be configured by using the View/Edit a Point menu selection (refer to section 13.5.1.1). When a point is created, its attributes are set to default values, and you will probably want to change these values to more accurately reflect the point's true characteristics.

13.5.1.3 Delete Last Point

Entering menu selection number 3 will delete the last point in the point array. Due to the DeviceNet specification requirement that parameter object instances must start at one and increment by one with no gaps in the instances, only the last parameter in the point list may be deleted. If a point that is currently not the last point in the list is to be deleted, Delete Last Point must be performed until the parameter that is to be removed is reached, and then the original desired points must be manually added back in. If a large number of points must be deleted to work down to an interior point to be removed, it may be helpful to Xmodem a point file to your computer or save the current configuration to another location in the file system on the gateway (in case you need to restore your original configuration), and to manually record the points' attributes from the View/Edit a Point menu (for ease of re-entry) prior to starting the deletions.

13.5.1.4 More Points

The View/Edit Points table displays the mapping information for 10 points at a time. If more than 10 points are available in the current configuration, menu selection number 4 will display the next 10 points in the list. When all points have been displayed, entering menu selection number 4 will roll back around to points 1~10 again.

13.5.1.5 DeviceNet Setup

Menu selection number 5 displays a page that allows configuration of the DeviceNet-specific characteristics, such as the assembly object sizes, membership lists and associated offsets, and network timeout mode. Refer to Figure 21 for an example. The top part of this screen contains the assembly objects' membership lists and offsets assigned to each of the member parameters. All four of the DNET-100's supported assembly objects are displayed for convenient reference.

Change Size: Enter menu selection number 1 with the additional arguments of the connection instance (polled or COS/cyclic), the assembly object used by the connection (produced or consumed), and the desired data size (produced_cnxn_size or consumed_cnxn_size, respectively). For example, the bottom of Figure 21 shows the entry string used for changing the polled I/O input assembly (instance #150) to 16 bytes. Once an assembly object's size has been configured, existing points can be added to the membership list by using the Change Offset menu command.

Change Offset: Enter menu selection number 2 with the additional arguments of the connection instance (polled or COS/cyclic), the assembly object used by the connection (produced or consumed), starting offset location, and the point (parameter) number. The target point then becomes a member of the indicated assembly object, and will either produce to or consume from the indicated location in the assembly object array. An example of assigning point #10 to reside at offset 4 of the COS/cyclic I/O consumed assembly (instance #101) would be "`2 cos cons 4 10`".

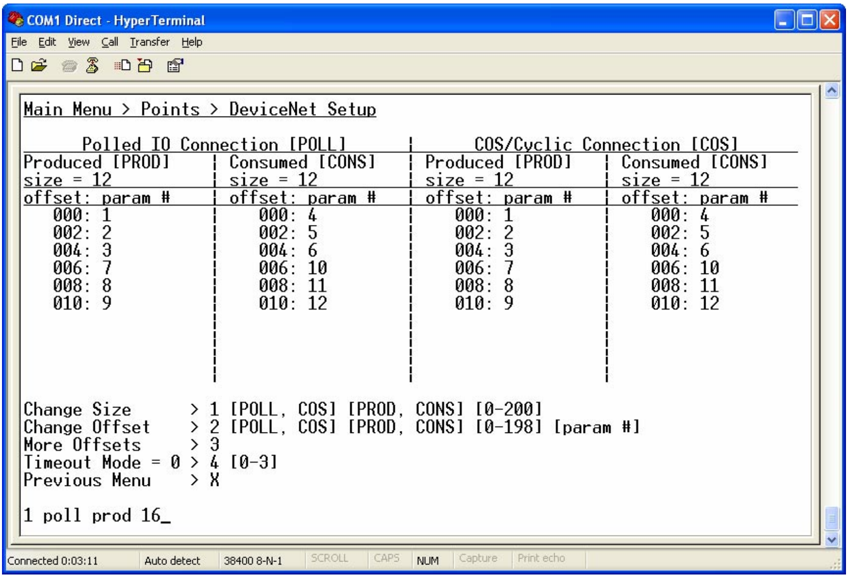


Figure 21: DeviceNet Setup

More Offsets: The assembly object membership list table displays the membership definitions 20 assembly bytes (10 offsets) at a time. If any assembly object size is larger than 20 bytes, menu selection number 3 will display the next group of offsets. When all offsets have been displayed, entering menu selection number 3 will roll back around to the initial offsets page again.

Timeout Mode: Displays the current DeviceNet timeout mode setting (0 in Figure 21) and allows changing this setting by entering menu selection number 4 with the additional argument of the desired timeout mode (0~3). For a detailed discussion of the network timeout configuration, refer to section 12.3. An example of changing the timeout setting to 1 would be "4 1".

13.5.1.6 Secondary Network Setup

Menu selection number 6 displays a submenu that provides a means to configure the characteristics of the selected secondary network, such as baud rate and parity. Note that not all secondary networks are user-configurable. The specific menu label and subsequent available submenu options therefore depend on the currently-active secondary network.

13.5.2 Save Points

Main menu selection number 2 allows the current gateway configuration to be saved to one of the three available file locations in the gateway's file system. It is important to reiterate that whenever any configuration changes are performed, they are performed only on the gateway's working memory, and that those changes will be lost unless they are saved to the gateway's file system prior to exiting the console. The saved file also becomes the new active file, which means that it will automatically be loaded from the file system into the gateway's working memory every time the gateway boots up. The gateway provides space for three independent files to be stored.

Refer to Figure 22 for an example of saving the current configuration to file system location #1 with the name "Assy_Line_6". "Assy_Line_6" will then also become the active file, and will be the configuration loaded into the gateway's working memory at the beginning of the next boot cycle.

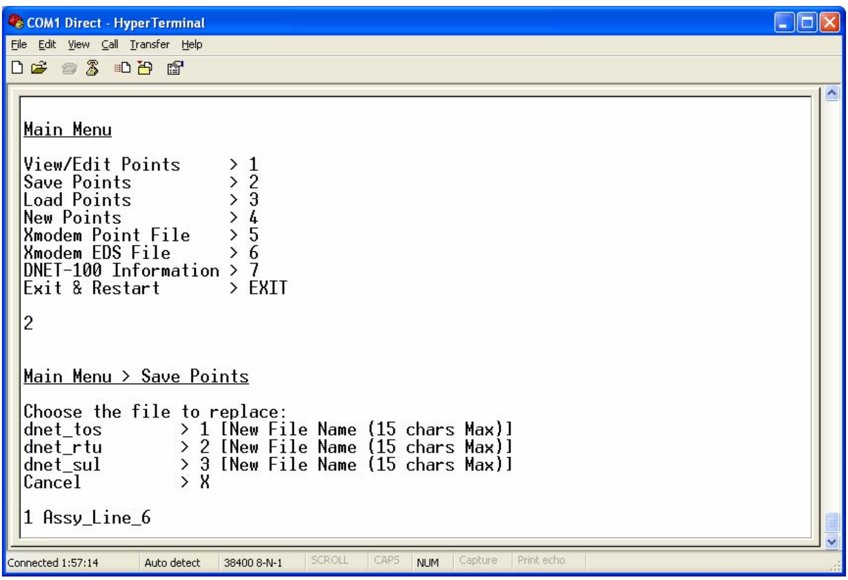


Figure 22: Saving a Point File

13.5.3 Load Points

Main menu selection number 3 allows the retrieval of a configuration file from the gateway's file system into its working memory. The configuration can then be modified while in the working memory and saved back to the file system if desired. Loading a file also causes it to become the active file, which means that it will automatically be loaded from the file system into the gateway's working memory every time the gateway subsequently boots up.

Refer to Figure 23 for an example of loading file “dnet_rtu”. “dnet_rtu” will then also become the active file, and will be the configuration loaded into the gateway’s working memory at the beginning of the next boot cycle.

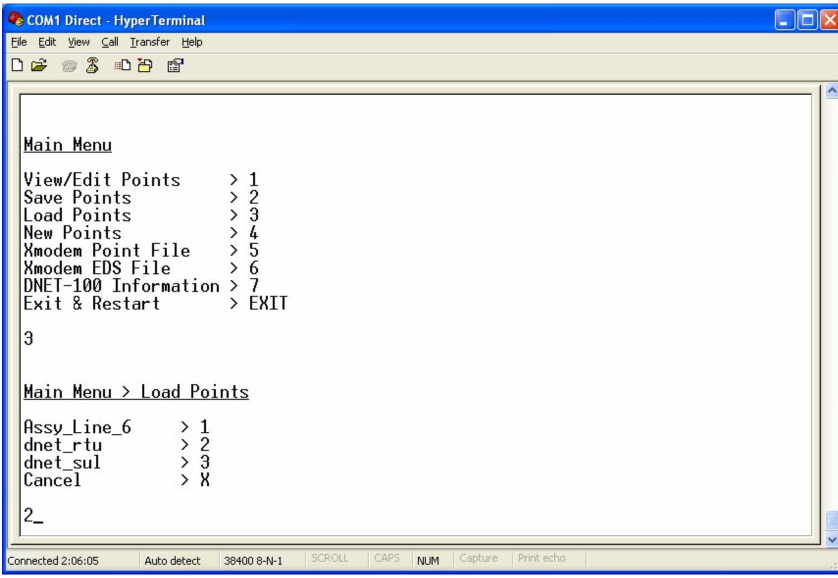


Figure 23: Loading a Point File

13.5.4 New Points

Main menu selection number 4 is used to begin a new configuration from scratch. When selected, a prompt will be displayed indicating that the current configuration in the gateway’s working memory will be cleared (refer to Figure 24). By selecting one of the available secondary network drivers (Modbus is being selected as an example in Figure 24), the current point configuration will be cleared and all primary and secondary network configurations will be set to their default values. The general configuration process outlined in section 12.4 must then be performed to add points, configure assembly objects, save the point file, etc.

After configuration has been completed, always remember to save the new point setup to the gateway’s file system prior to restarting. Otherwise, the currently-active file will be restored from the file system upon boot up, overwriting the newly-created setup.

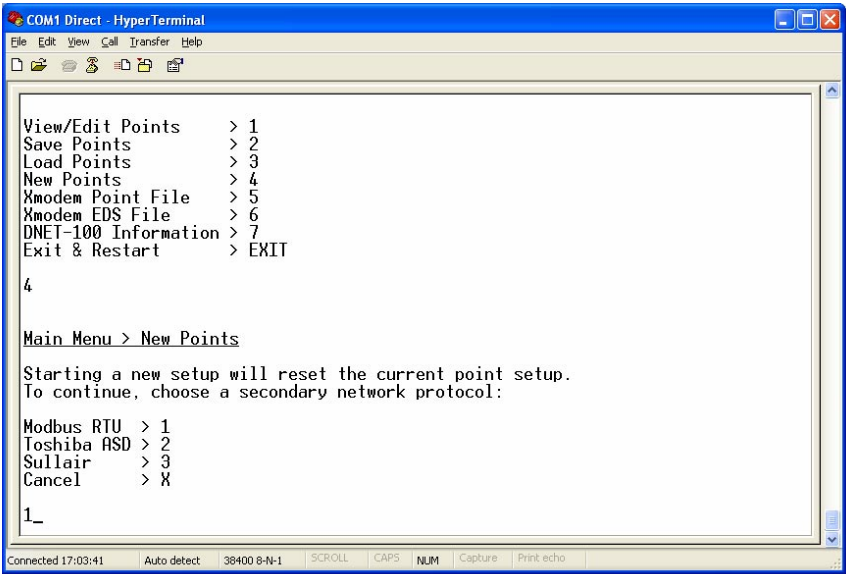


Figure 24: Beginning a New Setup

13.5.5 Xmodem Point File

Main menu selection 5 provides a method to upload and download point files to/from your PC via the Xmodem protocol. Xmodem is a data transfer protocol supported by virtually all terminal emulation programs (such as HyperTerminal).

Whenever a custom point setup is created, it is highly recommended that a backup copy of the file be downloaded to a PC in case it becomes necessary to restore it to the gateway's file system later (such as if the gateway's internal backup battery fails and requires replacement). Two different variations of the Xmodem protocol are supported (CRC and Checksum) for those terminal emulation programs that only support one or the other. This menu selection is also useful for copying point files from one gateway to another, or for uploading pre-configured point files that have been obtained from the ICC website.

Figure 25 shows an example of initiating the download of the file "Assy_Line_6" from the gateway's file system to the PC. Once the file to download has been chosen, the console will indicate that the gateway is now ready to transmit the file. At this point, you have 30 seconds in which to initiate the receive function of your terminal emulation program before the gateway will timeout the transaction and return to the main menu prompt.

In HyperTerminal, the "receive" function can be selected by the  icon in the toolbar. This will bring up a dialog box (Figure 26) that allows you to select the file destination and the transfer protocol (Xmodem). Lastly, you will be prompted for a filename which the point file will be saved under (Figure 27).

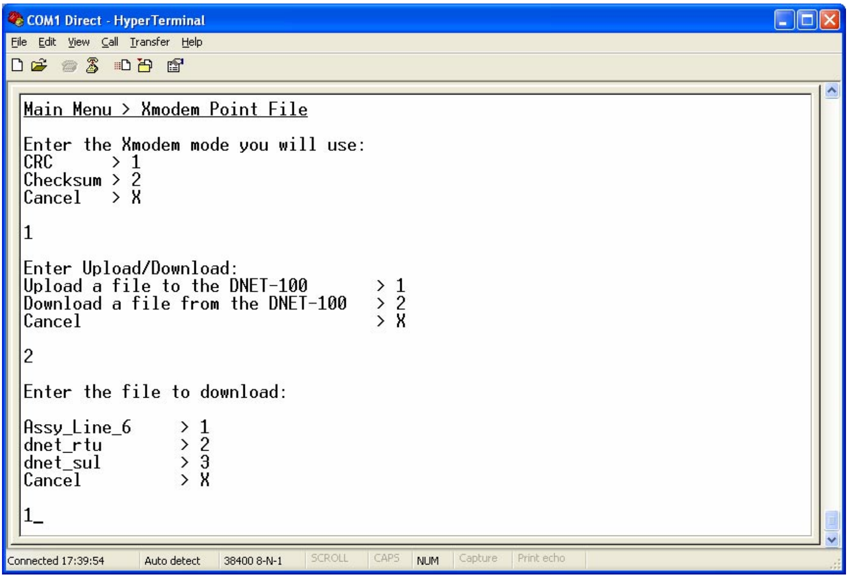


Figure 25: Downloading a Point File

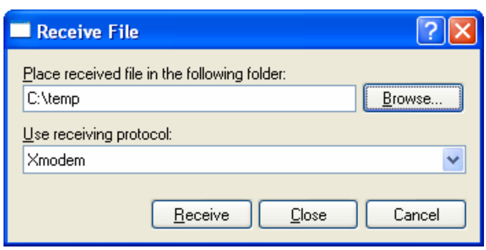


Figure 26: HyperTerminal "Receive File" Dialog Box

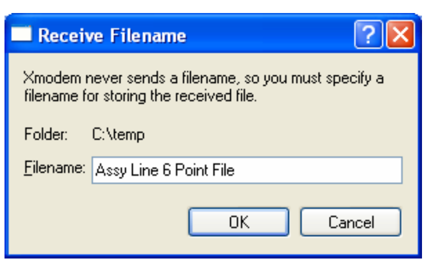


Figure 27: HyperTerminal "Receive Filename" Dialog Box

As soon as the filename is entered and “OK” selected, the download transfer will begin. This will only take several seconds to complete, and at the conclusion the console will indicate the status of the transfer and return to the main menu.

Uploading a file from the PC to the gateway is similar in many ways to downloading. Figure 28 shows an example of initiating a file upload. Once the console indicates that the gateway is ready to receive the file, you have 30 seconds in which to initiate the send function of your terminal emulation program before the gateway will timeout the transaction and return to the main menu prompt.

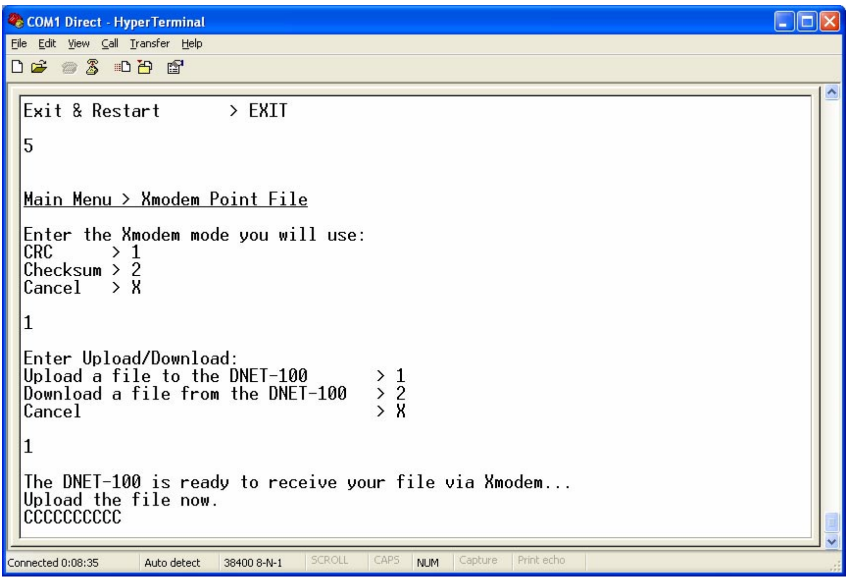


Figure 28: Uploading a Point File

In HyperTerminal, the “send” function can be selected by the icon in the toolbar. This will bring up a dialog box (Figure 29) that allows you to select the source file and the transfer protocol (Xmodem). Upon entering the information and selecting “Send”, the upload transfer will begin. This will only take several seconds to complete, and at the conclusion the console will indicate the status of the transfer and, if successful, will prompt for a file system location in which to store the received file. The console does not prompt for a filename, as the point file is internally watermarked with the name the file was given when it was originally created and stored in the file system.

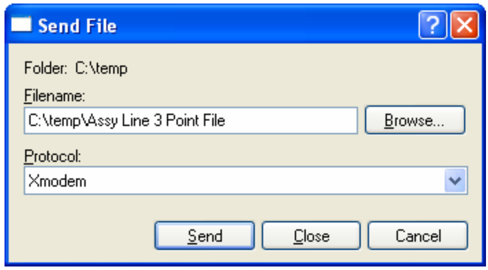


Figure 29: HyperTerminal "Send File" Dialog Box

13.5.6 Xmodem EDS File

Main menu selection number 6 provides the mechanism to download the custom-generated EDS (Electronic Data Sheet) file. The EDS will be generated based on the information currently residing in the working memory of the gateway. Once downloaded to the PC, the EDS can then be registered with a network configuration tool, such as *RSNetWorx*.

Figure 30 shows an example of initiating an EDS file download. Note that it is very similar to downloading a point file, as detailed in section 13.5.5, with the exception that no source file needs to explicitly be chosen.

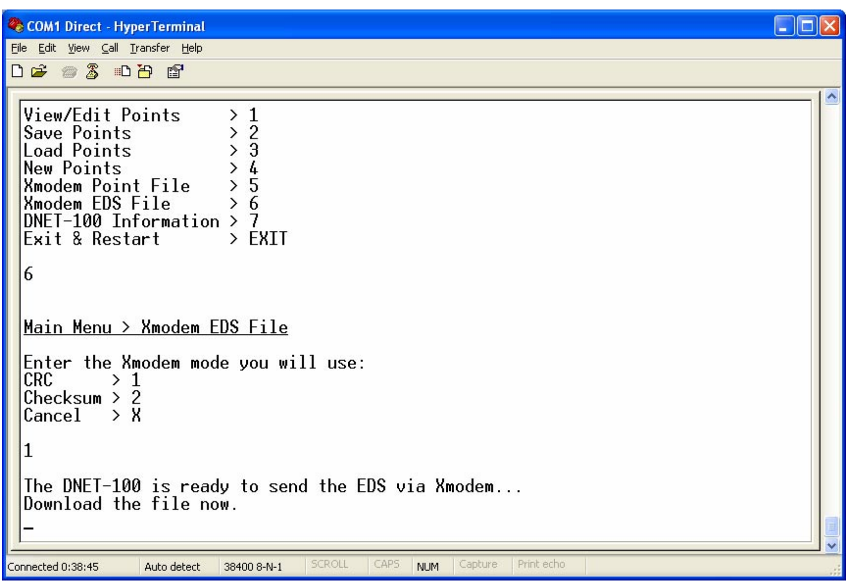


Figure 30: Downloading an EDS File to the PC

Once the console has indicated that the gateway is ready to transmit the EDS file, you again have 30 seconds in which to initiate the receive function of your terminal emulation program before the gateway will timeout the transaction and return to the main menu prompt. As in the point file case, you can use the "receive" function in HyperTerminal by selecting the  icon and entering a destination folder, transfer protocol and filename. To more easily distinguish EDS files from point files, it may be convenient to create a filename with an ".EDS" extension.

13.5.7 DNET-100 Information

Main menu selection number 7 displays a submenu with two key pieces of information: the application firmware version and the current real-time clock (RTC) date and time. The application firmware version information can be used to determine if a newer firmware version is available for download from www.iccdesigns.com (refer to section 15 for firmware updates).

The RTC setting can be changed by entering DNET-100 Information menu selection number 1 with the additional argument of the clock string. The clock string is a specially-formatted string encoded to sequentially contain the information for the current month (mm), day (dd), year (yyyy), hour (hh), minute (mm) and second (ss). The available ranges for the indicated fields are as follows:

Month ....01 ~ 12 (= January ~ December)
Day...........01 ~ 31
Year..........1980 ~ 2116
Hour ....00 ~ 23 (= 12 AM ~ 11 PM)
Minute ......00 ~ 59
Second .....00 ~ 59

Note that except for the "year" field (which is four characters long) all fields must be entered in as two characters (i.e. January must be entered in as "01", not just "1"). Also note that the hour field is displayed and must also be entered in "military time" format (i.e. 9 PM is an hour value of "21"). Figure 31 shows an example of setting the RTC to January 10th, 2004 at 4:03:30 PM.

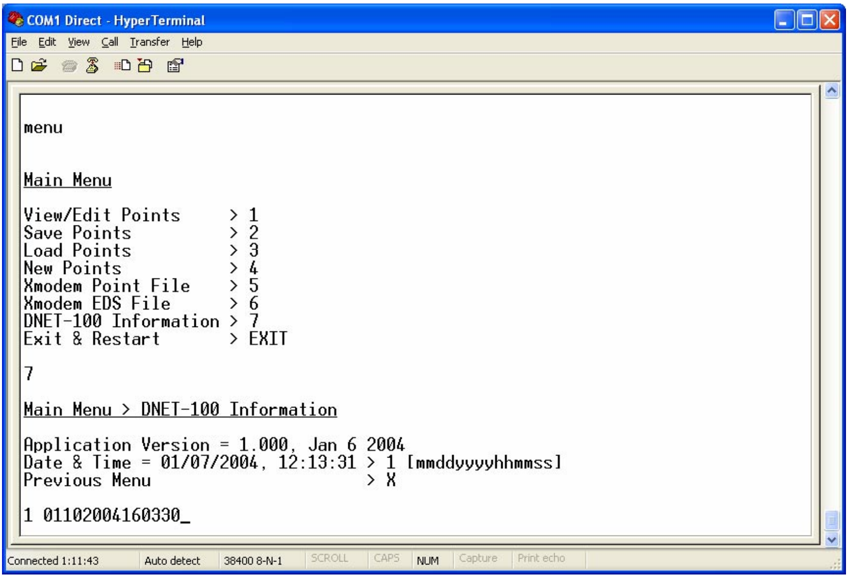


Figure 31: DNET-100 Information and RTC Setting

13.5.8 Exit & Restart

Type “exit” at any menu prompt to reboot the gateway and once again begin communication tasks. Note that whenever you modify the point database and are ready to restart the gateway, <u>you must save the database to the file system prior to restarting or your changes will be lost</u>. The console will automatically warn you that any unsaved changes will be lost and prompt you for confirmation every time you “exit”, even if the database had not been modified. If the database was unchanged, then no saving is required.

14. Network-Specific Information

This section will discuss topics that are specific to each of the available primary and secondary network selections.

14.1 DeviceNet (Primary) Network

- Table 8 outlines the objects supported within the device. For more specific details regarding the attributes and services supported by each object, refer to the separately-provided ODVA Statement of Conformance (SOC).

Table 8: Supported Objects

Object Class	# of Instances / Instance IDs	Class Code
Identity Object	1 / 1	0x01
Message Router	1 / 1	0x02
DeviceNet Object	1 / 1	0x03
Assembly Objects	4 / 100, 101, 150, 151	0x04
Connection Objects	3 / 1, 2, 4	0x05
Parameter Objects	User-defined / 1..100 max	0x0F
Acknowledge Handler	1 / 1	0x2B

- All secondary network objects that are to be accessed must be defined as DeviceNet parameters objects. Access is then available either via explicit messaging or via membership in an IO assembly object.

- DeviceNet object, BOI attribute: This attribute value is saved in the gateway's internal nonvolatile memory. If the BOI value is set to TRUE, the gateway will attempt to restart the network interface on the occurrence of a CAN bus-off event. This will continue to be the behavior until the Bus-Off Counter attribute achieves a value of 255. If a CAN bus-off event occurs after this point, the gateway will not attempt to restart the network interface: it will remain faulted and isolated from the network until reset (power removed from the unit or a console "exit" performed).

- If any gateway characteristics are modified in the course of configuration, remember to always download a new EDS file to your computer and re-register it with your network configuration tool.

- During I/O data exchanges, if the actual consumed data size is less than or equal to the connection instance's configured consumed connection size, then all received data will be consumed and the connection will produce normally. If the actual consumed data size is larger than the connection instance's configured consumed connection size, however, the consumed data will be ignored and the connection will not produce.

14.2 Secondary Networks

14.2.1 Modbus RTU

- The gateway acts as a Modbus RTU master via the secondary RS-485 port. Supported Modbus functions are indicated in Table 9.

Table 9: Supported Modbus Master Functions

Function Code	Function
3	Read multiple registers
16	Write multiple registers

- The slave response timeout is fixed at 3s.

- Network characteristics selections
    - Baud rate: 2400 / 4800 / 9600 / 19200 / 38400 bps
    - Parity: odd / even / none (1 stop bit) / none (2 stop bits)

- Console holding register number entry radix is decimal (e.g. 10 = 10_{10})

14.2.2 Toshiba Protocol

- As indicated via the console during point configuration, "ASD1", "ASD2" and "ASD3" are the only options available for secondary network addresses. Any addressing entered via the drive's panel ("inverter number" parameter, for example) has no relevance to how that drive is accessed by the gateway.

- The gateway acts as a Toshiba ASD master via the dedicated common serial port connections. All Toshiba ASDs that include a common serial port are supported.

- Network characteristics selections: no configuration is necessary, as the gateway automatically adapts to the ASD's configured characteristics.

- All parameter writes use the drive's RAM / EEPROM data write ("W") command. For all writes that target the drive's EEPROM, be sure to follow Toshiba's guidelines regarding the number of times a specific parameter can be written without risk of EEPROM damage.

- Console parameter number entry radix is hexadecimal (e.g. 10 = 0x10 or 16_{10})

14.2.3 Sullair Supervisor Protocol

- The gateway acts as a Sullair Supervisor Protocol network monitor via the secondary RS-485 port. It can automatically adapt to the Supervisor network configuration (sequencing or non-sequencing/slave mode).

- Any numerically-addressed parameter defined by the Supervisor protocol is directly accessible (machine type = parameter #1, etc.). However, some Supervisor data objects are not natively numerically-addressed. For these data objects, the additional parameter numbers indicated in Table 10 have been assigned.

Table 10: Additional Supervisor Parameter Assignments

Parameter Number	Item	Note	Source
100	Capacity		Net / quick status
101	P2		
102	Run hours		
103	Run status	0 = E-stop 1 = remote stop 2 = manual stop 3 = standby 4 = starting 5 = load 6 = unload 7 = trim 8 = full load	
104	Mode	0 = auto 1 = continuous	
105	P1		Info status
106	P2		
107	P3		
108	P4		
109	T1		
110	T2		
111	T3		
112	T4		
113	T5		
114	T6		
115	Run time		
116	Load time		
117	Digital outputs		
118	Digital inputs		
122	Online	0 = offline (not sequencing) 1 = online (sequencing)	Net / quick status
123	Faulted	0 = not faulted 1 = faulted	

- Network characteristics selections: no configuration is possible. The baud rate is fixed at 9600 baud.

- The gateway Supervisor interface is primarily a system monitor and configuration device. As such, the following native Supervisor network commands are not accessible:

  S – Stop
  L – Load (modulate)
  T – Trim (modulate)
  D – Display message
  C – Cont run mode
  U – Unload
  F – Full load
  E – Emergency stop
  A – Auto run mode

- Console parameter number entry radix is decimal (e.g. 10 = 10_{10})

15. Firmware Updates

The gateway's embedded firmware resides in flash memory that can be updated in the field. Firmware updates may be released for a variety of reasons, such as custom firmware implementations, firmware improvements and added functionality as a result of user requests.

ICC is continually striving to enhance the functionality and flexibility of our products, and we therefore periodically release new embedded firmware to achieve these goals and meet customer requests. Flash firmware files and all related documentation (such as updated user manuals) can be downloaded as complete board support packages (referred to as BSPs) from http://www.iccdesigns.com. It is suggested that users check this Internet site prior to installation, and then periodically afterwards to determine if new support packages have been released and are available to upgrade their units.

15.1 Requirements

Besides the new firmware file, firmware updates require a PC with a Windows operating system (Windows 95 or later) and a serial port, the RFU PC application (refer to section 15.3), and the MMI cable included with the gateway kit (ICC part number 10425).

Please be sure to read the firmware release notes and updated user's manual (included with the BSP) for any important notices, behavior precautions or configuration requirements prior to updating your firmware. For example, upgrading to a new firmware version may affect user-defined point files: prior to starting an update procedure always back up your point files to a PC for later recovery if necessary.

15.2 Connection

The gateway ships from the factory with a dust cover installed in the MMI port. To minimize contamination of the port's electrical contacts, keep this dust cover in place whenever the MMI port is not in use.

IMPORTANT: Note that the gateway will not be operating its system control and communication tasks while its internal firmware is being updated. Therefore, be sure to shut down the system to a known safe state prior to initiating the firmware update procedure.

Connect the RJ45 end of the MMI cable to the MMI port, and connect the other end to the computer's serial port. Move "CONFIG" switch #10 to the "ON" (down) position: this will place the gateway into the "firmware download" mode. Whenever "CONFIG" switch #10 is "ON", the gateway can only download firmware to its flash memory: all other application functions (such as communications, console access etc.) will be disabled.

15.3 Using the RFU Utility

Support for downloading new application firmware to the gateway is provided by the free Rabbit Field Utility (RFU), which is a 32-bit application that runs on Microsoft Windows platforms. The RFU utility can be downloaded from ICC's home page at http://www.iccdesigns.com. When downloading a new gateway application BSP, always confirm that you also have the latest version of RFU, as new .BIN firmware files contained in BSPs may require functionality found only in the most recent RFU versions for successful downloading.

The remainder of this section will detail the RFU utility configuration and firmware download procedures.

15.3.1 Required Files

When first downloaded, the RFU utility files are compressed into one self-extracting .EXE distribution file. Create a folder (such as c:\RFU), place the distribution file in this folder, and then execute it. This will extract the compressed files. The distribution file is then unneeded and can be deleted if desired. To run the RFU utility, double-click on the RFU.EXE file icon.

15.3.2 First-Time Configuration

The first time the RFU utility is run on a computer, several configuration items need to be confirmed. These configuration items are retained in the computer's registry from that point on, so reconfiguration is not required unless certain parameters (such as which serial port to use on the computer) are changed.

The two configuration items that need to be confirmed are the communications characteristics and bootstrap loaders path. First, select the "Setup…Communications" menu item (refer to Figure 32).

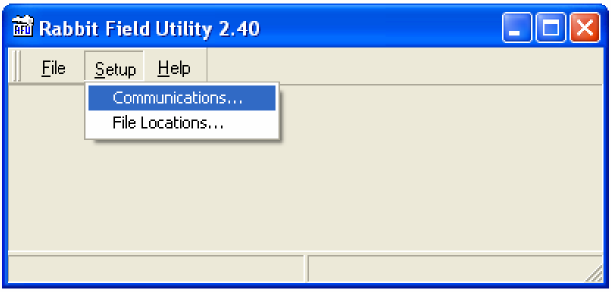


Figure 32: RFU Main Screen

The Communications Options window shown in Figure 33 then appears. Confirm that the settings are as shown, with the possible exception of the "Comm Port" settings, which depends on the COM port you are using. Click "OK" when complete.

Note: It is possible that certain computers may have difficulty communicating at a sustained 115kbaud rate, which may result in communication errors during firmware downloading. If this occurs, try setting the "baud rate" parameter shown in Figure 33 to a lower value.

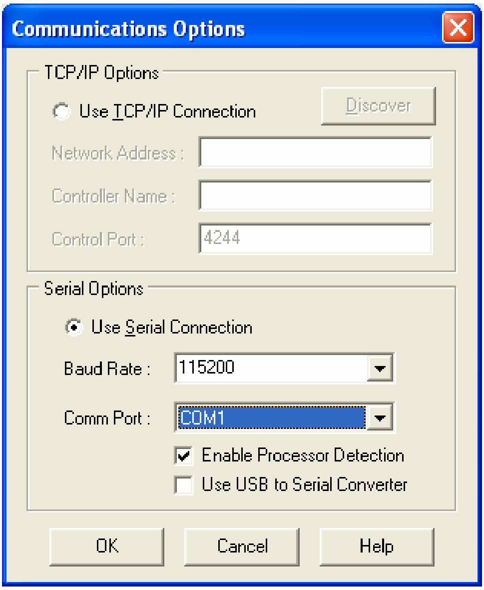


Figure 33: Communications Options Window

Next, select the "Setup…File Locations" menu item from the main screen. The "Choose File Locations" window shown in Figure 34 then appears. Confirm that the correct paths to the referenced files are entered. Enter the correct paths if necessary.

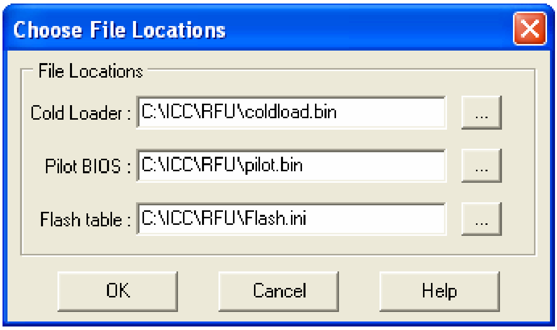


Figure 34: Choose File Locations Window

15.3.3 Transmitting Firmware Files

When a board support package (BSP) has been downloaded and unzipped, the flash firmware file will be the one with ".BIN" as its file name extension.

Once the RFU utility has been configured, the flash firmware files can be downloaded to the gateway by two different methods. The simplest way is to drag the application firmware .BIN file's icon and drop it onto the RFU utility's main screen. This will automatically initiate the download process.

Alternatively, select the "File…Load Flash Image" menu item (refer to Figure 35).

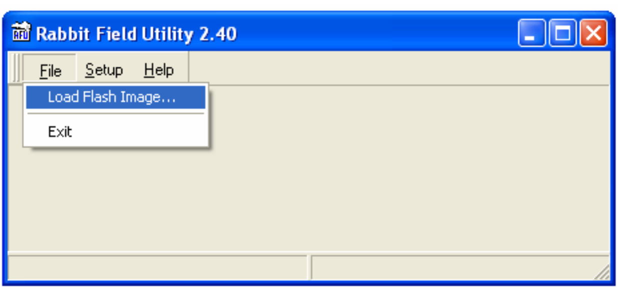


Figure 35: Load Flash Image Menu Selection

The flash image (.BIN file) selection window will then appear (refer to Figure 36). Browse to the location of the flash image file and select it. Clicking "OK" will then initiate the download process.

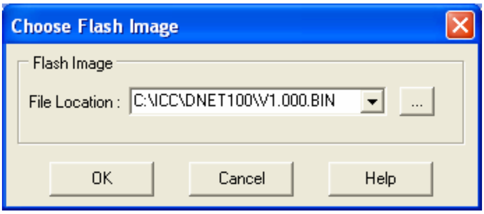


Figure 36: Flash File Selection Window

While downloading, the RFU utility will indicate the download status. Once complete, summary information will be displayed in the bottom status bar (see Figure 37).

Figure 37: Summary Information

15.4 Wrap-Up

Once downloading is complete, close the RFU utility, move “CONFIG” switch #10 back to the “OFF” (up) position to leave “firmware download” mode, and cycle power momentarily to the unit by either disconnecting the auxiliary power supply and/or powering down all connected drives or momentarily removing all drive communication cables from the unit.

When the unit powers up again, it will be running the new application firmware. If the new firmware version release notes indicated that point files need to be reloaded, then do so at this point.

When completed with MMI port use, remove the MMI cable and replace the MMI port dust cover to minimize contamination of the port’s electrical contacts.

16. Notes

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Printed in U.S.A