# OWNER'S MANUAL

**————————————**

# DS73 & DS73TP ETHERNET PERIPHERAL COMMUNICATIONS MODULE FOR THE DS-DATA SWITCH

BayTech Manual Publication #U140A126

Thank you for selecting a DS73 or DS73TP Ethernet Peripheral Communications Module for the DS Data Switch.

The data provided in this Owner's Manual explains the various ways you can operate your DS73/DS73TP Peripheral  Communications Module and configure it to your own computer system. We suggest that you read this manual carefully before attempting to install the module and that you place special emphasis on correct cabling and configuration.  If you have any problems with your installation, please contact a BayTech applications engineer for assistance at 800-523-2702.

BayTech manufactures many  data acquisition and control products, statistical multiplexers, printer sharing solutions, remote power switches and network print servers.  If you would like information on any of these products, please contact BayTech customer service.

We welcome any comments you may have about our products. And we hope that you will continue to look to BayTech for your data communications needs.

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# 1 GENERAL INFORMATION

The DS73 and the DS73TP peripheral communications module supports remote access to TCP/IP Ethernet networks by using the DS-Series Data Switch with a modem module installed. Remote users can dial into the DS-Series unit and connect to network hosts from anywhere at anytime. Both remote in-band and out-of-band management is available by using one DS-Series data switch. Use the DS73 module for in-band network management. And use the DS74, EIA-232 module for out-of-band management.

Remote workstations and PCs connect to the DS73 using a dial-up PPP session. This offers dial-up users a low cost IP network link suitable for remote access to the network.

**IMPORTANT:** You should determine what types of peripheral modules you have installed in your DS-Series unit in addition to the DS73 peripheral module. You should familiarize yourself with the various operation modes of the installed peripheral modules. A brief operational description of each peripheral module is provided in the DS-Series Owner's Manual.

# 2 SPECIFICATIONS

**PROTOCOLS:** PPP, TCP/IP, ARP & ICMP
**NETWORK INTERFACE:** Ethernet; IEEE 802.3 compliant, 10BASE2 (thin coax,
    BNC) and 10BASE-T (twisted pair, RJ-45). Automatic media and frame selection. The DS73 has
    both 10BASE-T and 10BASE2 connectors. The DS73TP has a 10BASE-T connector.
**FRAME TYPES:** Ethernet II & SNAP(802.3)
**SPEEDS:** 10 mbps
**BUFFER SIZE:** 256 KB
**SECURITY:** Password protected log-on procedure
**INDICATORS:**    Green LED - Link integrity
        Red LED - RX/TX
        Red LED - Connection status(CX)
**POWER REQUIREMENTS:** Supplied by DS-Series base unit.
    +5 VDC, 300 mA
**ENVIRONMENT: Operating Temperature Range:** 0° to 70° C.
    **Storage Temperature Range**: -40° to 80° C.
    **Humidity**: 5 to 95% RH.

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# 3 CABLING

**CAUTION:** Power should be turned off when cables are being installed.

## 3.1 10BASE2 (COAX) CONNECTION

The 10BASE2 port of the DS73 peripheral module connects to any BNC connector on the network cable. BayTech provides a T-connector for this purpose. The DS73TP has a 10BASE-T connector only. Please see the figure below.

## 3.2 10BASE-T (MODULAR) CONNECTION

If your network uses 10BASE-T, RJ-45 connectors, connect an RJ-45 cable between the RJ-45 port and the network hub. The modular port is defined as DTE (i.e., Pin 1 is TD+, Pin 2 is TD-, Pin 3 is RD+, and Pin 6 is RD-). Most RJ-45 network hubs will require a straight cable type. The *LINK* (link integrity) LED on the back panel and at the connected port on the hub will illuminate if there is a good connection between the DS73/DS73TP and the hub.

# 4 OPERATION

## 4.1 PROGRAMMABLE FEATURES

### 4.1.1 IP ADDRESS

The IP Address is the network address for the DS73 peripheral module. The IP Address consists of four bytes with each byte ranging from 0 to 255 decimal. This parameter must be programmed before the DS73 can be accessed on the network. **The factory default IP Address is 0.0.0.0.**

### 4.1.2 DIAL-IN IP ADDRESS
The Dial-up IP Address is the address given to the dial-in user during the establishment of the PPP link. The Dial-in IP Address consists of four bytes with each byte ranging from 0 to 255 decimal. This parameter must be programmed before the DS73 can be accessed on the network. **The factory default IP Address is 0.0.0.0.**

### 4.1.3 SUBNET MASK

The SUBNET Mask is a bit mask that identifies the network portion of the IP address, allowing the DS73 to determine whether to send a packet directly to the client or to a gateway. The Subnet Mask consists of four bytes with each byte ranging from 0 to 255 decimal. This parameter must be programmed before the DS73 can be accessed on the network. **The factory default Subnet Mask is 0.0.0.0.**

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### 4.1.4    GATEWAY

The Gateway is the address of a router for connection to other networks.  The Gateway address consists of four bytes with each byte ranging from 0 to 255 decimal.  **The factory default Gateway address is 0.0.0.0.**

### 4.1.5    PRIMARY DNS

The Primary DNS (domain name server) IP address to be provide if the user will be accessing domain name server on the network.

### 4.1.6    SECONDARY DNS

The Secondary  DNS (domain name server)  IP address to be provide if the user will be accessing domain name server on the network.

### 4.1.7    PRIMARY NBNS

The Primary NBNS (Net BIOS Name Server) IP address to be provide if the user will be accessing domain name server on the network.

### 4.1.8    SECONDARY NBNS

The Secondary NBNS (Net BIOS Name Server) IP address to be provide if the user will be accessing domain name server on the network.

### 4.1.9       USER NAME

The DS73 User name is required of all users who attempt to access the DS73.  The user name is given by the user when establishing a connection to the DS 73 module.  The user name consists of an ASCII character string with a maximum length of 8 characters.  The factory default user name is *"user1".*

### 4.1.10    PASSWORD

The DS73 Password  is required of the user prior to being granted access to the network.  The user, when establishing a connection to the DS73.  The Password consists of an ASCII character string with a maximum length of 8 characters.  **The factory default Password is BTA.**

### 4.1.11    MODULE NAME

The DS73 Module name is name reported by the module upon connection.  The module name consists of an ASCII character string with a maximum length of 8 characters.  The factory default module name is *"DS73".*

### 4.1.12    EXIT

To exit the DS73 configuration menu strike "X" (Exit).

## 5    DS73 MODULE CONFIGURATION

Configuration changes to the DS-Series with a DS73 Ethernet module installed are made through the DS71 Host module or through the EIA-232 service port.  The DS73 will respond with a menu prompting  you to enter the desired module number.  By responding to "C" to change the configuration of a DS data switch with a DS73 installed in Module 2 and two other modules, you will see a menu similar to the following:

```
Data Switch Series -F.1.07
```

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```
Bay Technical Associates

Port Select Code:  $BT
Attention Character:  ;

        DS73            (2,1)..................... 1
        Device A        (3,1)..................... 2
        Device B        (3,2)..................... 3
        Device C        (3,3)..................... 4
        Device D        (3,4)..................... 5
        Configure ............................... C
        I/O Module Reset ........................ RM
        Unit Reset .............................. RU
        Exit .................................... X
        Logout .................................. T
        Enter Request  : C

        Configuration
        Module 1..............1
        Module 2..............2
        Module 3..............3
        Select Port...........S
        Exit..................X
        Enter Request:  2
```

By responding to the *Enter Request*: message at the end of the configuration menu with "2" you receive the configuration menu for Module 2 that looks similar to the following:

```
        DS73 Ethernet Module
        F 0.02 Copyright (c) 1997
        Bay Technical Associates

        Enter user name:  user1

        Enter password: BTA

        Login successful.

         Module IP Address:   200.4.3.72   Dial-In IP Address:   200.4.3.73
         Subnet Mask:      255.255.255.0      Gateway Addr:  200.4.3.1
         Primary DNS:           0.0.0.0. Secondary DNS:          0.0.0.0.
         Primary NBNS:          0.0.0.0. Secondary NBNS:         0.0.0.0.
         Ethernet Addr: 00.C0.48.1A.24.5D        ID MSG/Login: enabled/enabled
         IP Address.................... 1 Network Cable Connections:  good

        Module IP Address............. 1
        Dial-In Ip Address............ 2
        Subnet Mask................... 3
        Gateway....................... 4
        Primary DNS................... 5
        Secondary DNS................. 6
        Primary NBNS.................. 7
        Secondary NBNS................ 8
        User Name..................... 9
        Password..................... 10
        Module name..................11
        Exit.......................... X
```

**NOTE:**  For detailed configuration information see the DS-Series Owner's Manual Number U140E121-03(Section 6).
**IMPORTANT:**  There should be no active connections while configuring the unit.  Reset the base unit after configuration.

## 5.1   MODULE IP ADDRESS

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Type "1" (Module IP Address), at the end of the main configuration menu and you can program the IP address. The DS73 will respond with:

```
Enter Module IP address in dotted decimal form:
```

Enter the desired Module IP address as a series of four numbers separated by periods (e.g., 197.3.14.9) followed by *Carriage Return*.

**NOTE:** The first part of the Module IP address is determined by assigned network address.

**IMPORTANT:** The Module IP address <u>must</u> be programmed before the DS73 module can be accessed on the network. After programming the IP address, the unit must be reset for the new information to take effect.


## 5.2   DIAL-IN IP ADDRESS

Type "2" (Dial-in IP Address) at the end of the main configuration menu and you can program the Dial-in IP address. The DS73 will respond with:

```
Enter Dial-in IP address in dotted decimal form:
```

Enter the desired Dial-in IP address as a series of four numbers separated by periods (e.g., 197.3.14.9) followed by *Carriage Return*.

**NOTE:** The first part of the Module IP address is determined by assigned network address.

**IMPORTANT:** The Module IP address <u>must</u> be programmed before the DS73 module can be accessed on the network. After programming the IP address, the unit must be reset for the new information to take effect.

## 8.3      SUBNET MASK

Type "3"(Subnet Mask) at the end of the main configuration menu and you can program the Subnet Mask. The DS73 will respond with:

```
Enter Subnet Mask in dotted decimal form:
```

Enter the desired Subnet Mask as a series of four numbers separated by periods (e.g., 255.255.255.0) followed by *Carriage Return*.

**IMPORTANT:** The Subnet Mask <u>must</u> be programmed before the DS73 module can be accessed on the network. After programming the Subnet Mask, the unit must be reset for the new information to take effect.

## 8.4      GATEWAY

Type "4"(Gateway) at the end of the main configuration menu and you can program the Gateway or router address. The DS73 will respond with:

```
Enter Gateway address in dotted decimal form:
```

Enter the desired Gateway or router address as a series of four numbers separated by periods (e.g., 197.3.14.1) followed by *Carriage Return*.

**IMPORTANT:** After programming the Gateway address, the unit must be reset for the new information to take effect.

## 8.5      Primary DNS

Type "5"(Primary DNS) at the end of the main configuration menu and you can program the Primary DNS. The DS73 will respond with:

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```
        Enter Primary DNS address in dotted decimal form:
```

Enter the desired Primary DNS address as a series of four numbers separated by periods (e.g., 0.0.0.0.) followed by *Carriage Return*.

## 8.6        PASSWORD

By responding to the *Enter selection:* message at the end of the main configuration menu with "*5*" (Password), you can program the DS73 Password.  The password is used for security purposes to prevent unauthorized users from connecting to the DS73 and accessing its functions.  The DS73 will respond with a menu similar to the following:

```
        Current password:  BTA
         Enter Password (8 chars max):
```

Type the desired password up to eight ASCII characters.  Press <ENTER> to return to the main configuration menu.

**NOTE:**  The password is case sensitive.  Any non-alphanumeric character including <BACKSPACE> and <DELETE> or a password greater than eight characters is interpreted as an input error and you will be prompted to enter the password again.

Terminate the password entry by typing the <ENTER> key.  The DS73 will respond with:

```
        Accept password as typed above? (Y/N) :
```

Press "Y" to accept the new password or "N" to reject it.  If you press "N", the DS73 will return to the "Enter Password" prompt.  If you type "Y", the DS73 will return to the main configuration menu.

**NOTE:**  It is not necessary to reset the unit for this option to take effect.

## 5.1.4      UNIT RESET

Users can instruct the DS-Serieswith the DS73 Ethernet module, to "reset" by using the *Menu Selection Method* to reset the unit.  Only a user connected to the peripheral module can issue the reset command.  Users can also instruct the DS-Seriesto reset by sending the ASCII string "$BTRESET" from the service port.  The Unit Reset and $BTRESET commands do not affect any saved configuration parameters that have been changed from the default values.

**Important:**  The Unit Reset command will terminate communications with connected equipment to the M-Series DAC.

You must  re-establish communications with the DS-Seriessystem after the unit has been reset.  The Unit Reset menu selection is found in the DS73 Module Menu.  This  Menu is invoked by sending the **Attention Character(default ;;;;;)** to the DS73 peripheral module five times.  The DS73 will respond with a menu similar to the following, if two Serial I/O modules are installed.

## 5.1.5.5     EXIT

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By responding to the *Enter Request*: message in the DS73 Status & Diagnostics Menu with "X" (Exit), you will exit the DS73 Status & Diagnostics Menu.  The DS73 peripheral module will respond with the following:

```
    > X
```

## 5.1.6    LOGOUT

By responding to the *Enter Request*: message in the DS73 Main Menu with "T" (Logout), you will terminate your TELNET connection.  The DS73 peripheral module will respond with a message similar to the following:

```
    Device A        (2,1).................... 1
    Device B        (2,2).................... 2
    Device C        (2,3).................... 3
    Device D        (2,4).................... 4
    Device A        (3,1).................... 5
    Device B        (3,2).................... 6
    Device C        (3,3).................... 7
    Device D        (3,4).................... 8
    Immediate Data Collection .............. I
    Configure .............................. C
    Manual Connection ...................... M
    Unit Reset ............................. R
    Module Status .......................... S
    Logout ................................. T

    <Your 'TELNET' connection has been terminated>
```

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# 9        GETTING STARTED

Before the DS73 or DS73TP and the DAC can be used, there are a few parameters which must be configured by the user.

First time power-up:  When the DS73 or DS73TP is first powered up, it will cycle through its diagnostics until it finds that it has not been programmed with an IP address or subnet mask.  At this point, it should flash its front panel LEDs 3 & 4.  An IP address and subnet mask are minimum requirements for module operation.  These parameters are configured using the following procedure:

1.        Access the DS73 through the Service Port:  The DS73 is programmed through the Service Port only.  Attach a 9FRJ45PC-3 or 25FRJ45PC-3 serial adapter to your PC's com port and connect a crossed RJ-45 cable between the serial adapter and the DS-SeriesEIA-232 service port.  Other terminal devices may      require a different adapter, consult the owner's manual or Bay Tech Technical Support.  Once the cable is      in place, invoke a communications program on the PC (e.g., BayTech TERM.EXE) and set the serial            parameters for 9600 baud, 8 data bits, 1 stop bit, no parity.  The following commands are all case    sensitive, so be sure to enter them accordingly.
         Type **$BTm<cr>** where m is a number corresponding to the DS73's installed location in the unit (1 to 16) and <cr> is *Carriage Return*.  This number may be determined by locating the module in the unit and reading its associated module number from the back panel area.

2.        Obtain the DS73's configuration menu:  After the module select string has been entered, you should see a message such as "Requested connection made."  After receiving this message, type **$CONFIG<cr>**.  This will display the DS73's status screen and the main configuration menu.

3.        Program the module's IP address:  Type "1" from the main configuration menu (IP Address).  You will be prompted to enter an IP address in dotted decimal form.  This consists of 4 numbers between 0 and 255 separated by periods (ex: 200.4.123.17).  After typing the desired address, type *Carriage Return* to enter the information.  The DS73 will return to the main configuration menu.

4.        Program the module's Subnet Mask:  Type "2" from the main configuration menu (Subnet Mask).  You will be prompted to enter a subnet mask in dotted decimal form.  This parameter is used by the DS73 to determine if a destination is a local address or one that resides on another subnet.  A binary representation of a properly entered subnet mask will consist of all "1"s in bit locations corresponding to the network portion of the IP address and all "0"s in bit locations corresponding to the peripheral portion of the IP address.  Observing the same conventions as for the IP address, enter the subnet mask (ex:255.255.255.128) followed by *Carriage Return*.

There may be other parameters you wish to configure, such as a gateway/router, but for now, this is enough to get going.  If you wish to change other parameters at this time, consult the relevant sections of this addendum.  When you are finished, type "X" at the main menu to exit configuration.  Reset the unit by typing **$BTRESET<cr>** or by cycling unit power for the changes to take effect.

After resetting the unit, you should see all 4 module LEDs flash on and off two times and then remain off.  This is a normal initialization indication.  After the second LED flash, the module is on line and ready for network access.

Configuration of other modules on the unit may be necessary or desirable, depending on your application and unit module population.  This configuration may be accomplished through the DS73 or the service port.  If you need additional help, call Bay Tech's Technical Support line for assistance in setting up your unit.

# 10        MAINTENANCE
Since there are no adjustments and no moving parts in the M Series DAC or the DS73 Ethernet module, therefore preventative maintenance is unnecessary.

# 11        RETURNS TO THE FACTORY

If you find it necessary to return any component of the DS-Seriesunit to the factory for warranty work or factory-set changes, follow the procedure listed under *Section 12* for repackaging.  Before you ship your unit, please call BayTech to get a Return Authorization number.  BayTech cannot accept warranty or no-charge returns without this number.  Ship your unit to the address listed in *Section 13*, - Technical Support.

# 12        REPACKAGING FOR SHIPPING

If you need to repack your unit for shipping, please choose a heavy cardboard box for packing.  Surround your unit with sufficient insulation (a minimum of 2-inches) to withstand the rigors of transport.  Be sure to seal the box securely with strapping or packing tape.  Masking tape or cellophane tape is not recommended.  Please put the Return Authorization number on the outside of the cardboard box.

# 13        TECHNICAL SUPPORT

In the event that you have problems with the unit, BayTech has a staff of applications engineers on duty to assist you from 7 AM to 6 PM (CST or CDT), Monday through Friday.  Contact our Web Site

at the address given below.  When you call BayTech Tech Support, please have the following information available to help the applications engineers answer your questions more efficiently:

1.       Identify which modules you are using and have the serial number handy (located on the back of the unit).

2.       Identify what peripheral device and peripheral devices you have connected to the unit.

3.       Provide a general description of the application you are using.

4.       Identify what cables/adapters you are using, the lengths of the cable and who sold you the cables/adapters.

5.       Identify any special options you may have ordered.
6.       If possible, have a print-out of the unit's configuration status ready when you call.
   **Always call BayTech before dismantling your equipment or before returning the unit to BayTech for repair.**

   **Bay Technical Associates, Inc.**
   **PO  Box 387, 200 N.  Second Street**
   **Bay St. Louis, MS 39520 USA**
   **Phone: 228-467-8231 or 800-523-2702**
   **Web Site: www.baytechdcd.com**
   **Fax: 228-467-4551**

# 14        FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFACE STATEMENT

**NOTE:**  This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this manual may cause interference to radio communications.  The equipment has been type tested and found to comply within the limits for a Class A digital device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference in a commercial environment.  Operation of this equipment in a residential area is likely to cause interference in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

The user may not, under any circumstances, other than specified in the manual, under installation and maintenance sections, attempt any service, adjustments, or repairs on this unit.  It must be returned to the factory or authorized service agency for all such work.

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# 15        DS73/DS73TP EPROM UPGRADE

You will receive two EPROMs (chips with label A & B) for each module to be upgraded.

The materials you will need to supply are:
Phillips-head screwdriver
IC DIP extractor or a pair of curved needle-nose pliers

1.        **IMPORTANT:** Remove power from the unit by depressing the power switch on the front of the unit to OFF. Also remove power cord from the AC outlet.

2.        Remove the appropriate module by loosening the 2 straight slot screws that attach the connector board I/O module to the chassis and then pulling the module out.

3.        Refer to *Section 16* (Mechanical Layout) and locate sockets *U7 and U6*.

4.        Note carefully how the existing EPROMs are installed in the sockets. Remove the existing EPROMs from sockets *U7 and U6* with IC extractor or needle-nose pliers. Gradually loosen each side of the chip, alternating pliers from side to side. Do not bend the pins on the EPROMs. Pull the loosened EPROM all the way out.

5.        Install the new EPROMs into sockets *U7 and U6*.

a. The EPROMs should be placed to the rear of the sockets. The vacant pin receptacles of the socket are adjacent to the notch on the socket. Insure that the notch of the EPROM and the notch on the socket face the same direction.
b. Install the "B" EPROM into socket *U7*(see the label on the EPROM). The "B" EPROM can be identified with either a DS73-B or DS73TP-B.
c. Install the "A" EPROM into socket *U6*(see the label on the EPROM). The "A" EPROM can be identified with either a DS73-A or DS73TP-A.
d. Be careful not to bend any of the pins. Insure that none of the pins miss the receptacles of the sockets.

6.        Re-install the DS73 and apply power to the unit. The upgrade is now complete. Before you begin operations, check the configuration status to make certain it matches your application.

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