



Toshiba V Series Operation Manual

Integrated controller, ethernet module / ds connection module

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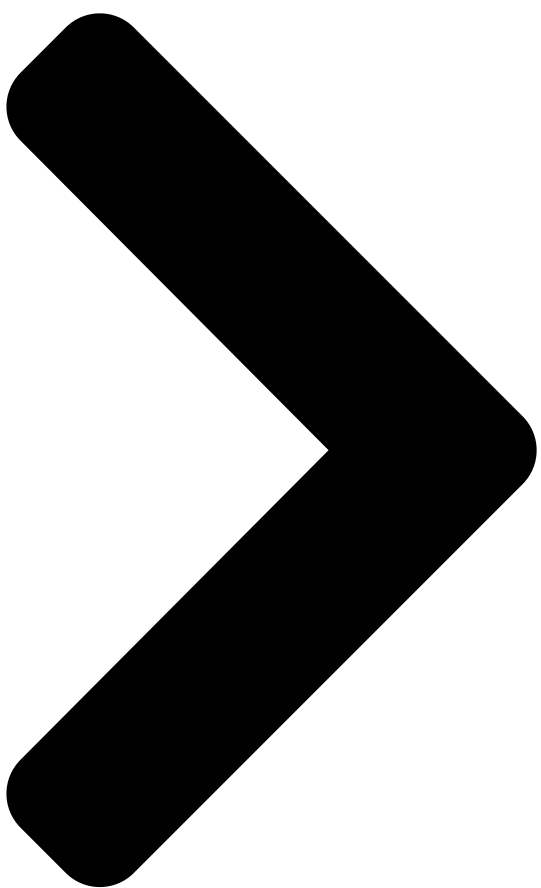
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6F8C0878 **TOSHIBA**
Integrated Controller V Series
model 3000 Ethernet Module /
DS Connection Module
Operation Manual
Dec 31, 2003

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Summary of Contents for Toshiba V Series

[Page 1](#) 6F8C0878 Integrated Controller V Series model 3000 Ethernet Module / DS Connection Module Operation Manual Dec 31, 2003...

[Page 2](#) Important Information No patent liability is assumed by TOSHIBA Corporation with respect to use of information, illustrations, circuits, equipment or examples of application in this publication. TOSHIBA Corporation reserves the right to make changes and improvements to this publication and/or related products at any time without notice.

[Page 3](#) Safety Precautions This manual contains important information for the operator to operate this product safely and correctly and avoid bodily injury and property damage. Grasp

the meanings of the following marks and their descriptions before reading this manual. Hazard Classifications Indicates a potentially hazardous situation which, if not avoided, WARNING could result in serious injury or death.

[Page 4](#) 1. Checking the Warning Labels on the Main Unit Make sure warning markings are attached on the main unit. If any of them are missing or the wording is illegible, contact Toshiba's Service Department. 2. Precautions on Installation WARNING Mandatory Be sure to ground the equipment.

[Page 5](#) 3. Safety Precautions on Maintenance and inspection WARNING Mandatory Mandatory Turn off power removing or connecting any Turn off power removing any modules after modules, boards, or devices. installing. Otherwise, it can cause electrical shock, or Otherwise, exposed conductive parts of wire machine damage.

[Page 6](#) User's manual. beyond normal range or if failure is occurred Otherwise, it can cause malfunction, machine in the equipment. damage or fire due to overheat. Contact Toshiba for repairing. Operation under such situation can cause fire or electrical shock. CAUTION Forbidden...

[Page 7](#) Forbidden Forbidden Do not disassemble or modify the equipment. Do not enter wire scrapes or other foreign Otherwise, it can cause malfunction or failure. debris into the equipment. Also, do not insert metal parts into them. They can cause fire or accidents. 6.

[Page 8](#) Toshiba is not liable for any incidental loss caused by the use or non-use of this product, such as loss of business profits, suspension of business, or loss or change of data on memory.

[Page 9](#) This manual describes the interface module EN7** (called EN7 module in the manual) and the DS connection module FN711 which connect controllers of the Integrated Controller V Series to the surveillance and control network Ethernet for that series, presenting an overview, installation and operating procedures, and instructions for maintenance and inspection.

[Page 10](#) If the ambient temperature or the internal temperature of the equipment has arisen too high, or if the equipment has developed a fault, stop using it, switch power off, and contact the nearest Toshiba service station. Do not open the case of the equipment while it is in operation except when setting the switches.

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[Page 15: General](#)

The Ethernet module EN7** (called the EN7 module in this manual) is a device for connecting controllers of the the integrated controller V series to the monitoring and control network Ethernet (conforming to IEEE802.3) for that series. The DS connection module FN711 (called the FN module in this manual) is a device for connecting controllers to the surveillance and control network Ethernet (conforming to IEEE802.3) by...

[Page 16](#) Chapter 1 General Figure 1-1 Front View of EN7 and FN Modules model 3000 Ethernet Module / DS Connection Module Operation Manual...

[Page 17](#) Features of Ethernet (10BASE5, 10BASE2) The monitoring and control network Ethernet for the integrated controller V series can expand the segments and extend the maximum transmission distance using an electric repeater or an optical repeater. A system which includes both 10BASE5 and 10BASE2 permits connection of each network using a hub.

[Page 18](#) Chapter 1 General Human Machine Interface for monitoring FA personal computer Monitoring and control network Ethernet Repeater Integrated controller Figure 1-2 Example of System Configuration FA personal computer LAN card installed inside Ethernet Base unit Base

unit S0 S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 S0 S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 (Up to 4 modules can be installed per base unit.) Figure 1-3 Example of Ethernet Module Installation...

[Page 19](#) Software configuration Software configuration realizes the transmission operation of EN*** module is as follows. V controller user program Function Block Controller (USEND_T, URCV_T) module V controller firmware Station bus EN*** firmware SNMP Ethernet TCP/UDP/IP module 10BASE5, 10BASE2 100BASE-TX/10BASE-T • Function Block: Controller user programs perform the Ethernet transmission using function blocks.

[Page 20](#) Chapter 1 General SNMP (Simple Network Management Protocol) Ethernet modules support the SNMP agent function. Ethernet modules transmit the own information in response to the query of management system (manager). Supported information is shown below. • System group: System group provide system and management information. •...

[Page 21: Names Of Parts And Their Functions](#)

Chapter 2 Names of Parts and their Functions The front panels of the EN7 and FN modules and their explanations are shown in figure 2-1 and figure 2-2. EN711 EN721 module for 10BASE5 module for 10BASE5 single bus dual bus Status indicator LED Status indicator LED •...

[Page 22](#) Chapter 2 Names of Parts and their Functions EN751 EN761 module for 100BASE-TX/10BASE-T module for 100BASE-TX/10BASE-T single bus dual bus Status indicator LED Status indicator LED • RUN • RUN • HLTH • HLTH • L-A • L-A • L-B Station address setting switches Operation mode setting switches Serial communication port (RS-232C)

[Page 23](#) The functions of these parts are shown below. (1) Status indicator LEDs These LEDs display operating status, etc. as shown in Table 2-1. However, RUN and HLTH on the FN module depend on the combination of two LEDs as shown in Table 2-2 below.

[Page 24](#) Chapter 2 Names of Parts and their Functions Table 2-2 Indication of FN Status LEDs Controller Type Mode Description HELT Dual-line Single-line Power OFF Power switched off ERROR Down Just after power is switched on. ● ○ Changes to other mode in 1 second. Equalizing by standby controller of dual- line system.

[Page 25](#) (4) 12 VDC power receiving terminal board (+12 VDC 1 A maximum) The EN711 and EN721 (10BASE5) require a separate external power supply of 12 VDC for AUI transceivers. The external power to be supplied to the AUI transceivers is received at this terminal board.

[Page 27: Setting](#)

Apart from them, the ports No. 50000 through No. 50999 cannot be used for FN modules. Use ports No. 1024 to No. 65535 for user applications except for the reserved ports. • If you have any question, contact the Toshiba service office concerned. 6F8C0878...

[Page 28: Switch Setting](#)

Chapter 3 Setting 3.1 Switch Setting Before installing EN7 modules in the base unit, set the switches which determine an EN7 module operation mode and host ID. These switches are inside the EN7 module. The switch setting procedures are described below. Figure 3-3 and Figure 3-4 shows the locations of the switches.

[Page 29: Host Id Setting Switches \(Host-Id\)](#)

3.1 Switch Setting 3.1.2 Host ID setting switches (HOST-ID) The product has in it the hexadecimal rotary switches that are used to set a host ID to determine an IP address on the Ethernet. Set a host ID in the range of 1 to 126 allocated to a system during the process of its building, using HEX (hexadecimal) code.

[Page 30: Operation Mode Setting Switches \(Mode\)](#)

Chapter 3 Setting 3.1.3 Operation mode setting switches (MODE) The product has in it the 8-bit DIP switches that determine EN7 and FN module operation. Use a small screwdriver for their setting. Each of these switches for EN711, EN721, EN731, and EN741 is described in Table 3-2 Operation Mode Setting Table.

[Page 31](#) 3.1 Switch Setting Each of the switches for EN751 and EN761 is described in Table 3-3. Table 3-3 Operation Mode Setting Table (EN751, EN761) Default Switch No. Name Function

Setting (Before shipment) Operation mode M1=off Operation M0=off Normal (Normal setting)
Reserve Reserve Test program...

[Page 32](#) Chapter 3 Setting Each of the switches for EN751 and EN761 is described in Table 3-5. Table 3-5 Operation Mode Setting Table (FN711) Default Switch No. Name Function Setting (Before shipment) Operation mode M1=off Operation M0=off Normal (Normal setting) Reserve Reserve Memory clear TEST Test program...

[Page 33](#) 3.1 Switch Setting Front panel Operation mode setting switches MODE Host ID setting switches HOST-ID ☐ ☐ Figure 3-3 Locations of Switches (EN711, EN721, EN731, EN741) H : High L : Low L : Low Station address setting switches Operation mode setting switches On side...

[Page 34: Network Parameter Setting](#)

Chapter 3 Setting 3.2 Network Parameter Setting Set network parameters using the operation mode setting switches and host ID setting switches. For the switch setting procedures, refer to Table 3-1, Table 3-2, Table 3-3, and Table 3- Set the following network parameters on the EN7 module. Select only IP addresses of class B only for the FN modules.

[Page 35](#) 3.2 Network Parameter Setting IP address setting Set network parameters by the kind of IP address used. Setting procedures are as follows. Start Use dual network. Single network is used. Go to ① Use default IP address of EN module. Free IP address is used.

[Page 36: Network Id And Subnet Mask Setting](#)

Chapter 3 Setting 3.2.1 Network ID and subnet mask setting Class B (General) Setting (Integrated Controller Standard Setting) Set the IP address type to Class B (general) using the operation mode setting switches. This is the standard setting for an integrated controller system. This setting is also used in connecting to a general Ethernet.

[Page 37](#) 3.2 Network Parameter Setting Arbitrary setting Set the IP address type to [Setting from Tool] using the operation mode setting switches. This enables arbitrary setting with the engineering tool, and the network ID has priority over the value set with the host ID setting switches. This setting is done with connecting RS-232C cables to EN7 module.

[Page 38: Station Address \(Host Id\) Setting](#)

Chapter 3 Setting (7) After downloading, switch off the base unit connected EN7 module. (8) Change operation setting switch of EN7 module to [Setting from Tool (arbitrary setting)]. (Setting from Tool: set address type IP0 and IP1 of operation mode setting switch to on.

[Page 39: Multicast Address Summary](#)

3.2 Network Parameter Setting 3.2.3 Multicast address summary The EN7 module supports 15 multicast addresses, which are as shown in the table below. Table 3-6 Multicast Address
Multicast Address 225.224.0.1 225.224.0.2 225.224.0.3 225.224.0.4 225.224.0.5 225.224.0.6
225.224.0.7 225.224.0.8 225.224.0.9 225.224.0.10 225.224.0.11 225.224.0.12 225.224.0.13
225.224.0.14...

[Page 40: Setting With Engineering Tool](#)

Chapter 3 Setting In a multicast system, the controllers can be divided into groups as shown in figure 3-5. Controllers 1, 2, 4, 5 belong to Group A and controllers 3, 5, 6 to Group B. If Group A is set to the multicast address of 225.224.0.1 and Group B to the multicast address of 225.224.0.2, the address 225.224.0.1 is registered in controllers 1, 2, and 4 and the address 225.224.0.2 in controllers 3 and 6, while the addresses 225.224.0.1 and 225.224.0.2 are registered in controller 5, thus grouping the controllers as shown.

[Page 41](#) 3.2 Network Parameter Setting (2) Start the configuration editor [Hardware Configuration] of controller A. The screen showing the registered hardware configuration of controller A appears. For hardware configuration registration, refer to the Engineering tool operation manual. (3) The following screen appears when [Edit (E)] [Parameter Setting (P)] is executed after selecting EN741.

[Page 42](#) Chapter 3 Setting (4) Register parameters according to the system configuration diagram. If the IP address type is class B, register 172.16.64xx (xx means the host ID, which is 20 in this example) and the subnet mask of 255.255.192.0. (5) After registering them, execute

[File (F)] [Write (W)]. Then, return to the configuration editor [Hardware Configuration] of controller A, and execute [File (F)] [Save (S)].

[Page 43](#) 3.2 Network Parameter Setting (7) Open the connecting configuration (LAN configuration) by a double click. (8) Double-click the No. 1 module name in the system (S) column to open the module connection screen, and register a module type to connect. In this case, select EtherLANDouble (Ethernet dual).

[Page 44](#) Chapter 3 Setting (9) Click Connection (C) to register. The registered result is displayed as shown below. (10) Register LAN (L). Select the connected LAN in the LAN (L) column, double-click the No. 1 module name to open the module connection screen, and register a module type to connect. In this case, select the station (controller A) (Ethernet card for 10BASE2 dual) model 3000 Ethernet Module / DS Connection Module Operation Manual...

[Page 45](#) 3.2 Network Parameter Setting (11) Click Connection (C) to register. The registered result is displayed as shown below. (12) Execute [File (F)] [Save (S)] to save the registered information. (13) Confirm the current EN7 module information. First, connect the Engineering tool to the serial communication port of the EN7 module (TOOL) and take out the information.

[Page 46](#) Chapter 3 Setting (14) After registering the above, confirm that the network information of the corresponding Ethernet module can be read from the serial communication port (TOOL). Start the configuration editor [Hardware configuration] for controller A to open the screen which shows the registered hardware configuration for controller A. Then select EN741 and execute [Edit (E)] [Parameter setting (P)] to open the following screen.

[Page 47](#) 3.2 Network Parameter Setting (16) If the EN7 module information is read out of the serial communication port normally, confirm that the EN7 module information can be read out through the Ethernet. To confirm that the information could be read out through the Ethernet, first disconnect the RS-232C cable.

[Page 48: Setting With Engineering Tool 2](#)

Chapter 3 Setting Network Parameter Setting The network parameters include IP address, subnet mask and multicast address. Registered parameters can be downloaded into the Ethernet modules as described below. Preparations on the Ethernet module side Connect the Engineering tool to the serial communication port (TOOL) of the Ethernet module with the RS-232C cable.

[Page 49](#) 3.2 Network Parameter Setting (2) Register a unit in the station. Select [New (W)] with selecting the unit under the registered station. (3) Register a module in the unit. Select [New (W)] with selecting the module under the registered unit. Select an EN7 module from module adding dialog. 6F8C0878...

[Page 50](#) Chapter 3 Setting (4) Select [module parameter] from [file] menu with selecting the added module, the module parameter window is shown. model 3000 Ethernet Module / DS Connection Module Operation Manual...

[Page 51](#) 3.2 Network Parameter Setting (5) Register parameters according to the system configuration diagram. If the IP address type is class B, register 172.16.64.xx (xx means the host ID, which is 20 in this example) and the subnet mask of 255.255.192.0. (6) Then, register the network from the product tree.

[Page 52](#) Chapter 3 Setting (7) Select [EtherLAN] from the network adding dialog (if the module is dual bus one, select [EtherLANDouble]). Select [New (W)] with selecting the module under the added EtherLAN. (8) Select the EN7 module which is selected from the module adding dialog, it is connected to EtherLAN.

[Page 53](#) 3.2 Network Parameter Setting (9) Confirm the current setting of EN7 module. First, connect the Engineering Tool 2 to the serial communication port of the EN7 module (TOOL) and take out the setting. Set the transmission parameter from [Tool (T)] [comm param (P)] of the product tree. In this case, confirm the setting using the serial communication port.

[Page 54](#) Chapter 3 Setting (10) After registering the above, confirm that the network setting of the corresponding EN7 module can be read from the serial communication port (TOOL). Open the module parameter window of the registered EN7 module from the product tree. (11) Click

the [Tool and Module], the network setting of the EN7 module is shown.

[Page 55: Multicast Address Setting](#)

3.2 Network Parameter Setting 3.2.6 Multicast address setting (1) In multicast address setting, enter the number of multicast addresses to be registered first in the item Multicast registering count. (1 in this case) (2) Register multicast IP addresses. Up to 15 addresses from 224.0.0.0 to 239.255.255.255 can be set.

[Page 56: Settings For Multicast Routing Network](#)

Chapter 3 Setting 3.2.7 Settings for multicast routing network Register the parameters as shown below, when EN7 module is connected to multicast routing network with multicast router. (1) Set the IP address mode to free mode. (2) Set the option switch 1. (3) Set the multicast TTL.

[Page 57](#) 3.2 Network Parameter Setting The above setting example of module parameter window is shown below. 6F8C0878...

[Page 58: Ethernet Link Speed And Duplex Setting](#)

Chapter 3 Setting 3.2.8 Ethernet link speed and duplex setting Link speed and duplex are set to "Auto" at initial setting; they are configured properly by auto-negotiation. But if auto-negotiation is not worked properly, this parameter can fix link speed and duplex. The configurable pair is as follows. (This parameter is valid for EN751, EN751A and EN761 only.) •...

[Page 59: Default Gateway Ip Address \(Router Ip Address\)](#)

3.2 Network Parameter Setting 3.2.9 Default gateway IP address (Router IP address) setting (1) In using the default gateway (router), Set a default gateway IP address (router IP address). There is only one default gateway IP address that can be set. The default gateway can be used only if IPF ON and IP address type [Setting from Tool] are set using the operation mode switches.

[Page 60](#) Chapter 3 Setting An example of setting with Engineering Tool is Shown below. Note: Multicast messages from EN711, EN721, EN731, EN741, EN761, FN711 will not be transmitted beyond the default gateway. And multicast messages from EN751 and EN751A will be same, only if IGMP operation will set to off by option switch model 3000 Ethernet Module / DS Connection Module Operation Manual...

[Page 61: Installation And Wiring](#)

- Verify transmission at the application level using the transmission protocol.
- If power cannot be switched on or if other kind of trouble occurs, stop use and contact the Toshiba service office concerned.
- If you have any question, contact the Toshiba service office concerned.

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[Page 62: Installation \(Installing In The Base Unit\)](#)

Chapter 4 Installation and Wiring 4.1 Installation (Installing in the Base Unit) Caution • If the base unit is placed horizontally, either observe the specified working temperature range or use a cooling fan for forced air cooling of the base unit. Working temperature range is as follows: Vertical installation: 0 to 55 Horizontal installation: 0 to 40...

[Page 63: Ethernet Cable Connection](#)

4.2 Ethernet Cable Connection 4.2 Ethernet Cable Connection Connect the Ethernet cables (AUI cable: 10BASE5; 3D-2V: 10BASE2; category 5 twisted pair cable: 100BASE-TX/10BASE-T) to the EN7 or FN modules. 4.2.1 10BASE5 (EN711, EN721) (1) Push up the slide lock on the Ethernet connector (EN-A or (EN-B) and connect the AUI cable.

[Page 64: 10Base2 \(En731, En741\)](#)

Chapter 4 Installation and Wiring 4.2.2 10BASE2 (EN731, EN741) (1) Attach the T adaptor to the Ethernet connector (EN-A or EN-B). Turn the ring on the T adaptor and check that the adapter is locked on the Ethernet connector of the EN7 module.

[Page 65: 100Base-Tx/10Base-T \(En751, En751A, En761, Fn711\)](#)

4.2 Ethernet Cable Connection 4.2.3 100BASE-TX/10BASE-T (EN751, EN751A, EN761, FN711) Connect the category 5 twisted pair cable to an Ethernet connector (EN-A or EN-B). (Exercise care about the direction of the connector tab.) After inserting the cable into the connector,

check that it is locked. EN7 module Ethernet connector Figure 4-6 Connecting Category 5 Twisted Pair Cable...

[Page 66: Serial Communication Port \(Rs-232C\) Cable Connection](#)

Chapter 4 Installation and Wiring 4.3 Serial Communication Port (RS-232C) Cable Connection In program downloading or maintenance, communication with the tool is possible using the serial communication port (TOOL). The RS-232C cable connector is the 9-pin D-sub socket type. EN7 module Serial communication port (TOOL) RS-232C...

[Page 67: Vdc Power Cable Connection](#)

4.4 12 VDC Power Cable Connection 4.4 12 VDC Power Cable Connection Warning • Be sure to use a heat-resistant, insulated cable of AWG22 (0.75 mm²) or over as power cable. • Be sure to keep the cover on the terminal board to prevent electric shock. •...

[Page 68: Module Replacement](#)

Chapter 4 Installation and Wiring 4.5 Module Replacement Caution • Before replacing a module, switch off the base unit and the +12 VDC power supply, and make sure that power is off. When changing the switch settings on a module or when it has failed, replace the module 4.5.1 10BASE5 (EN711, EN721) (1) Switch off the base unit and the +12 VDC power supply.

[Page 69: 10Base2 \(En731, En741\)](#)

4.5 Module Replacement Module guide for base unit EN7 module Slide lock Base unit Remove it after checking that unit power is off. AUI cable (Push up slide lock to disconnect the cable.) Disconnect +12 V power cable after switching power off.

[Page 70](#) Chapter 4 Installation and Wiring (5) It is necessary that network parameters are downloaded, when [Setting from Tool] is used or multicast address setting is done. Download the parameters with connecting Engineering Tool to serial communication port (Tool) of EN7 module. (Download form Ethernet is not possible before downloading the parameters.) (6) After downloading, switch off the base unit connected EN7 module again.

[Page 71: 100Base-Tx/10Base-T](#)

4.5 Module Replacement 4.5.3 100BASE-TX/10BASE-T (EN751, EN751A, EN761, FN711) (1) Switch off the base unit. Check the LED to make sure that its power has been cut off. Hold down the tab of the modular connector connected to the module, and disconnect the category 5 twisted pair cable.

[Page 73: Operation](#)

Manual and make sure never to set the switches wrong. • If power cannot be switched on or if other kind of trouble occurs, stop use and contact the Toshiba service office concerned. • If you have any question, contact the Toshiba service office concerned. 6F8C0878...

[Page 74: Check Before Operation](#)

When the EN7 or FN modules start, check that they are operating normally, referring to Table 2-1 (page 9) in Chapter 2. If the modules fail to start, or if their operation is not normal, stop use and contact the nearest Toshiba service office. 5.3 Stopping The system stops when power is switched off.

[Page 75: Error Reset](#)

5.5 Error Reset 5.5 Error Reset In case of FN module error down, analyze the error and resolve the problem. The FN module can now be restarted. There are two ways of error reset as follows. • Error reset using the Engineering Tool •...

[Page 77: Maintenance And Inspection](#)

• If power cannot be switched on or if other kind of trouble occurs, stop use and contact the Toshiba service office concerned. • If you have any question, contact the Toshiba service office concerned. 6F8C0878...

[Page 78: Inspection](#)

Check that the wiring is as specified in the Manual for Monitoring and Control Network

Installation and Wiring as to bends, radius, route, etc. If anything abnormal is found, contact the Toshiba service office concerned. (c) EN751, EN751A, EN761, FN711 Check that the modular connector is locked.

[Page 79: Periodic Inspection](#)

To prevent accidents and ensure safe operation over a long period of time, a periodic inspection of at least once a year is recommended. It is also recommended that expendable parts be replaced periodically. (See the section on expendable parts.) For periodic inspection, consult the Toshiba service office concerned. 6F8C0878...

[Page 80: Troubleshooting](#)

If the LEDs that indicate the status of the product show other than the normal indications specified in Table 2-1 (page 9) in Chapter 2, or if an error is detected at a human interface station, stop using the product and contact the nearest Toshiba service office concerned.

[Page 81: Expendable Parts](#)

6.3 Expendable Parts To ensure safe use of the product for a long period of time to come, it is necessary to periodically replace expendable parts. For their replacement, contact the Toshiba service office concerned. Table 6-2, page 67 shows the expendable parts and their replacement intervals.

[Page 83: Application Interface](#)

Chapter 7 Application Interface The EN7 and FN modules provide status information on each of the sockets used by a user application and diagnostic information on the transmission lines connected to the EN7 modules in the network through the station bus. Information on each socket comes in two types: single Ethernet socket information and dual Ethernet socket information.

[Page 84: Socket Information](#)

Chapter 7 Application Interface 7.1 Socket Information 7.1.1 Structure of single Ethernet socket information Status information on each single Ethernet socket is shown in figure 7-1. P O P C O T C P U D P R C L r e s e r v e Figure 7-1 Status Information on Each Single Ethernet Socket Conditions where each of the following bits takes the value "1"...

[Page 85](#) 7.1 Socket Information The station bus addresses to which single Ethernet socket information is supplied are shown in word addresses. Word offset Socket 0 130944 Socket 1 130945 Socket 2 130946 Socket 46 130990 Socket 47 130991 The station bus base addresses vary depending on the slot where an EN7 module is installed.

[Page 86: Structure Of Dual Ethernet Socket Information](#)

Chapter 7 Application Interface 7.1.2 Structure of dual Ethernet socket information Status information on each dual Ethernet socket is shown in figure 7-2. T C P U D P P O P C O R C L r e s e r v e Figure 7-2 Status Information on Each Dual Ethernet Socket Conditions where each of the following bits takes the value "1"...

[Page 87: Socket Information Reference Method](#)

7.1 Socket Information The station bus addresses to which dual Ethernet socket information is supplied are shown in word addresses. Word offset Socket 0 130784 Socket 1 130785 Socket 2 130786 Socket 22 130806 Socket 23 130807 The station bus base addresses vary depending on the slot where an EN7 module is installed.

[Page 88: Socket Information Generation Timing](#)

Chapter 7 Application Interface 7.1.4 Socket information generation timing A timing chart for setting and clearing information on each socket is shown below, provided that it is opened by TCP/IP and closed after sending/receiving data. S o c k e t i n f o r m a t i o n Active (Client) Passive (Server) (N o t e : T h e s e r v e r f i r s t s e n d s a n o p e n r e q u e s t . . .

[Page 89](#) 7.1 Socket Information A timing chart of setting and clearing each bit of socket information is shown below. Socket information Passive <TCP> <AOP> <POP> <CON> <RCV> <RCL> Open Receive Close request request request request accept connect Open Send Close request request request Active <TCP>...

[Page 90: Transmission Line Diagnosis Information](#)

Chapter 7 Application Interface 7.2 Transmission Line Diagnosis Information The EN7 modules mutually monitor the operation of themselves in the same segment. A diagnostic frame is sent from one EN7 module to another in the same segment at constant intervals of 10 seconds through Port No. 48000, and the reception of the frame is mutually acknowledged.

[Page 91: Transmission Diagnosis Information Reference](#)

7.2 Transmission Line Diagnosis Information 7.2.2 Transmission diagnosis information reference method Transmission line diagnosis information covers Line A only if the transmission line is of a single configuration; or both Lines A and B if it is of a dual configuration. Transmission line diagnosis information address Word offset Line A information...

[Page 92: Transmission Line Diagnostic Frame Structure](#)

Chapter 7 Application Interface 7.2.3 Transmission line diagnostic frame structure The transmission line diagnostic frame sent from the EN7 module is as specified below. Transmission interval: 10 seconds Protocol: Destination address: Subnet broadcast Example: In case of 172.16.64.xx, subnet mask: 255.255.192.0 Line A: 172.16.127.255 Line B: 172.16.191.255 Destination port:...

[Page 93: En Module State Information](#)

7.3 EN module state information 7.3 EN module state information EN module state information is the RAS information like transmission request counter from host module (S controller, L controller and so on), transmission and receive packet counter in the EN module, transmission buffer counter, etc. This information is deployed on the station bus.

[Page 94: Restrictions On Use](#)

Chapter 7 Application Interface 7.4 Restrictions on Use 7.4.1 Restrictions on port numbers Be careful not to use the following ports for EN7 modules because they are reserved for system use. Port No. 10000: PCMP Port No. 48000: Transmission line diagnosis Be careful not to use the following ports for FN modules because they are reserved for system use.

[Page 95: A Specifications](#)

Appendix A Specifications A.1 General Specifications Table A-1 General Specifications (EN711, EN721, EN731, EN741) Specifications Item EN711 EN721 EN731 EN741 Working temperature range Vertical installation: 0 to 55 (Product ambient temperature) Horizontal installation 0 to 40 C (With forced air cooling: 0 to Working humidity range 10 to 95% RH (No condensation) Storage temperature range...

[Page 96](#) Appendix A Specifications Table A-2 General Specifications (EN751, EN751A, EN761, FN711) Specifications Item EN751A EN751 EN761 FN711 Working temperature range Vertical installation: 0 to 55 (Product ambient temperature) Working humidity range 10 to 95% RH (without condensation) Storage temperature range -25 to 70 Storage humidity range 5 to 95% RH (without condensation)

[Page 97: Ethernet Transmission Specifications](#)

A.2 Ethernet Transmission Specifications A.2 Ethernet Transmission Specifications Table A-3 Ethernet Transmission Specifications Item Specifications Applicable standard IEEE802. 3 • 10BASE5 • 10BASE2 • 10BASE-T IEEE802. 3u • 100BASE-TX Media access CSMA/CD Data transmission speed 10Mbps/100Mbps Ethernet frame DIX type Topology Ethernet frame DIX format...

[Page 98: Function Specifications](#)

For PCMP: Port No.10000 For node diagnosis: Port No.48000 ONS transmission port Nos. 50000 to 50999 Note: PCMP, IRCP, and ONS are Toshiba protocols. Confirm transmission of the sent data at application level. A.4 Serial Communication Port (RS-232C) Transmission Specifications...

[Page 99: B Dimensions](#)

Appendix B Dimensions External views of EN7 and FN modules are shown with dimensions below. [mm] 112.7 Figure B-1 Dimensions 6F8C0878...

[Page 101: C Related Products](#)

Appendix C Related Products Table C-1 Related Products Product Model Standard Applicable
cord Remarks 3D-2V ZCA123A***1 BNC connector 4Y8B0271P001 For use in bus-A (10BASE2
cable) 10BASE2 panel ZCA133A***1-B BNC connector 4Y8B0271P002 For use in bus-B 10BASE2
panel 5D-2W ZCA125A***1 BNC connector 4Y8B0272P001 For use outside bus-A (10BASE2
cable)

[Page 103](#) Appendix D Decimal-hexadecimal Conversion Table Table D-1 Decimal-
Hexadecimal Conversion Table Decimal Hexadecimal Decimal Hexadecimal Decimal
Hexadecimal Decimal Hexadecimal 6F8C0878...

[Page 105: E Sample Programs](#)

Appendix E Sample Programs For your reference, simple examples of message transmission
programs are shown below. Use communication FBs, USEND_T and URCV_T, for these purposes.
For a detailed description of communication FBs, refer to the Instruction Manual for S/L
Controllers (6F8C0865). <Example of UDP transmission>...

[Page 106](#) Appendix E Sample Programs Variable definition (UDP transmission)
OPEN_COMPLETE: BOOL; OPEN_ERROR: BOOL; OPEN_REQ: BOOL; TX_COMPLETE: BOOL;
TX_ERROR: BOOL; TX_REQ: BOOL; OPEN_STATUS1: INT; USEND_T_1: USEND_T; USEND_T_2:
USEND_T; SEND_STATUS: INT; US_DUMMY1: WORD; US_DUMMY2: UINT; US_SIZE: UNIT;
US_DAT:FARRAY[0..511] OF WORD; U_O: typeUDP_OPEN; U_S: typeUDP_SEND_BC;...

[Page 107](#) Program (UDP transmission) / * U D P O P E N R E Q U E S T * / U _ O . S l o t 1 6 # 0
0 3 1 U _ O . C m d 2 0 0 1 4 U _ O .

[Page 108](#) Appendix E Sample Programs Variable definition (UDP reception) OPEN_COMPLETE:
BOOL; OPEN_ERROR: BOOL; OPEN_REQ: BOOL; RX_COMPLETE: BOOL; RX_ERROR: BOOL;
RX_REQ: BOOL; CLOSE_COMPLETE: BOOL; CLOSE_ERROR: BOOL; CLOSE_REQ: BOOL;
RCV_STATUS: INT; CLOSE_STATUS: INT; UR_DUMMY1: WORD; UR_DUMMY2: UINT; UR_SIZE:
UNIT; UR_DATA:ARRAY[0..512] OF WORD; URCV_T_1: WORD;...

[Page 109](#) Program (UDP reception) / * U D P O P E N R E Q U E S T * / U _ O . S l o t 1 6 # 0 0
3 1 U _ O . C m d 2 0 0 1 3 U _ O .

[Page 110](#) Appendix E Sample Programs / * U D P R E C E I V E R E Q U E S T * / O P E N _ S T
A T U S 1 U _ R . S o c k e t M O V E _ I N T U _ R .

[Page 111](#) <Example of TCP transmission> STN1 STN2 (slot number) 172.16.64.7 172.16.64.4
The program shown here for reference sends data from S3 of STN1 through the Ethernet TCP
port 30004 of STN1 to S2 of STN2 where the data is received through the Ethernet TCP port
30003.

[Page 112](#) Appendix E Sample Programs Program (TCP transmission) / * T C P O P E N R E Q U
E S T (A C T I V E) * / T _ O . S l o t 1 6 # 0 0 3 5 T _ O .

[Page 113](#) Variable definition (TCP transmission) OPEN_COMPLETE: BOOL; OPEN_ERROR:
BOOL; OPEN_REQ: BOOL; RX_COMPLETE: BOOL; RX_ERROR: BOOL; RX_REQ: BOOL;
CLOSE_COMPLETE: BOOL; CLOSE_ERROR: BOOL; CLOSE_REQ: BOOL; RCV_STATUS: INT;
CLOSE_STATUS: INT; TR_DATA:ARRAY[0..512] OF WORD; T_O: typeTCP_OPEN; T_R:
typeTCP_RCV; T_C: typeTCP_CLOSE; URCV_T_1: URCV_T; USEND_T_1: USEND_T;
OPEN_STATUS1: INT;...

[Page 114](#) Appendix E Sample Programs Program (TCP reception) / * T C P O P E N R E Q U E S
T (P A S S I V E) * / T _ O . S l o t 1 6 # 0 0 3 5 T _ O .

[Page 115](#) / * T C P R E C E I V E R E Q U E S T * / O P E N _ S T A T U S 1 T _ R . S o c k e t T _
R .

[Page 117: F Return Code List](#)

Appendix F Return Code List A list of EN-related return codes is shown below. These return
codes are output by communication FBs. For a detailed description of communication FBs, refer

to the Instruction Manual for S/L Controllers (6F8C0865). USND_T/URCV_T Return Code List
Return Value Description -5000...

[Page 118](#) Appendix F Return Code List Communication Return Description Procedure Value •
ACCEPT ENOBUFS Resource short EBADF Socket identifier not valid EWOULDBLOCK Socket set
in asynchronous I/O mode, no socket waiting for connection EOPNOTSUPP Specified socket not
SOCK_STREAM type EPROTO Protocol error •...

[Page 119](#) Communication Return Description Procedure Value • SEND • SENDTO
EHOSTUNREACH Unable to sent to specified destination ECONNABORTED Disconnected in local
system ENOBUFS Failed to secure resource EBADF Socket identifier not valid EFAULT Parameter
(buffer point) incorrect EWOULDBLOCK Send request unacceptable EMSGSIZE Message size
incorrect EPIPE...

[Page 121: G Option Switch List](#)

Appendix G Option switch List Option switch configuration table is shown below. Setting option
switch to "ON", corresponding function is worked. Option switch No. Contents Target module
Transmission line diagnosis function for IP address EN711-741, EN751, free mode EN761,
EN751A IGMP function EN751, EN751A SNMP agent function...

[Page 123](#) INDEX Index For dual bus NUMBER For single bus 100BASE-TX/10BASE-T 10BASE2
10BASE5 General specifications AUI cable Host ID 13, 14, 20, 26, 28, 60 Download IEEE802.3 IP
address type IRCP 3, 84 Electrical repeater EN711 EN721 EN731 Memory backup EN741
Multicast 3, 20, 25, 26, 84 EN751...

[Page 124](#) INDEX 10, 15, 16, 20, 60 Optical repeater PCMP 3, 84 Periodic inspection RS-232C
Segment Serial communication port Serial communication port (RS- 232C) transmission
specifications Status indicator LED Subnet mask 22, 28, 34 TCP/UDP/IP 3, 84 Test program T-
type adapter 55, 56, 87 model 3000 Ethernet Module / DS Connection Module Operation
Manual...

[Page 125](#) 3000 Ethernet Module / DS Connection Module Operation Manual 4th edition 31st
Dec, 2003 0879.4.0312 INDUSTRIAL AND POWER SYSTEMS & SERVICES ELECTRICAL APPARATUS
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Reserved.

This manual is also suitable for:

3000 seriesEn711En721En731En741En761 ... [Show all](#)