Toshiba V Series User Manual

Integrated controller

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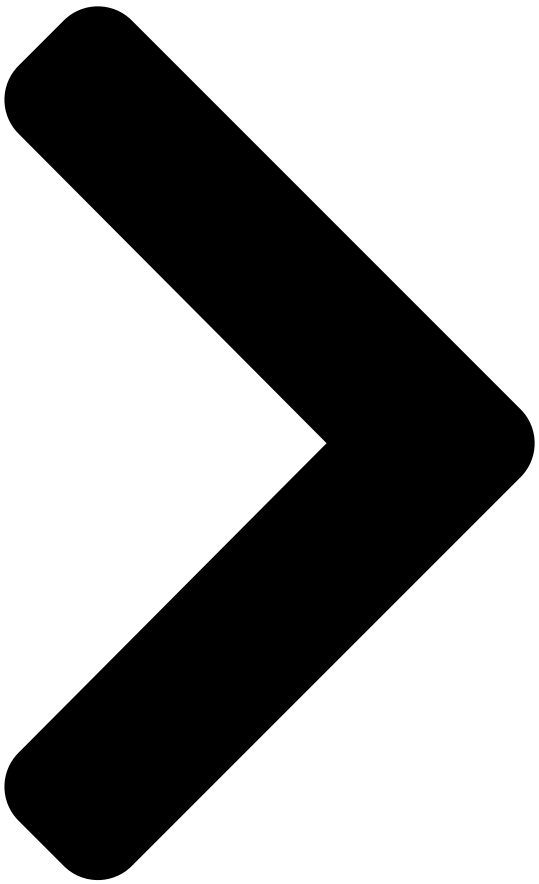

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Integrated Controller V Series model 3000 PROFIBUS Module User's Manual

May 28, 2002

TOSHIBA CORPORATION

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Summary of Contents for Toshiba V Series

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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 Preface This manual presents the specifications of the data communication network "PROFIBUS" master module PF311 and slave module PF312 for the Integrated Controller V Series model 3000, and describes its operating procedures. Be sure to read this manual in order to use the module correctly.

Page 10 (5) Where humidity is high or where there is condensation. If the device internal or external temperature becomes abnormally high or if there is a malfunction, stop operation, turn off the power and contact the nearest Toshiba service station. Do not open the case while operating.

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Page 13: Module Overview

The PROFIBUS module enhances connectability by providing PROFIBUS connection to integrated controllers in addition to conventional device net module. Summary of PROFIBUS module. Connected device Integrated Controller V Series model 3000 (S3 and RIO) Number of connected Up to 122 stations stations Transmission speed 9.6 Kbps to 12 Mbps...

Page 14 Chapter 1 Module Overview The following module is used as the PROFIBUS-DP transmission controller for this module. Master module (PF311) : HMS AnyBus Profibus DP Master (ABM-PDP) Slave module (PF312): HMS AnyBus Profibus DP Slave (ABS-PDP) model 3000 PROFIBUS Module User’s Manual...

Page 15: Configuration

Chapter 2 Configuration 2.1 System Configuration Example Model 3000 Configurator (PC) Shielded twisted pair cable Terminating Terminating resistor Motor drive unit Motor drive unit resistor Slave equipment Figure 2-1 System configuration example (1) Model 3000 PF311 Configurator (PC) Terminating Shielded twisted pair cable resistor Terminating resistor...

Page 16: Pf311 Module External

Chapter 2 Configuration 2.2 PF311 Module External Figure 2-3 PF311 Appearance drawing

model 3000 PROFIBUS Module User’s Manual...

Page 17: Pf312 Module External

2.3 PF312 Module External 2.3 PF312 Module External Figure 2-4 PF312 Appearance drawing 6F8C0921...

Page 18: Name Of Pf311 Module Components And Parts

Chapter 2 Configuration 2.4 Name of PF311 Module Components and Parts Status LED Configurator port Transmission cable terminating resistor specification switch Transmission cable connector Reset switch Mode 2 setup switch Mode 1 setup switch Loader port (for maintenance) Figure 2-5 Name of components and parts •...

Page 19 PROFIBUS-DP transmission cable connector • Reset switch (RESET) Press when the PF311 is abnormal or when initializing the PF311 independent of the controller. • Loader port (LOADER) PC (loader for use by TOSHIBA maintenance personnel) connector. (Normally not used.) 6F8C0921...

Page 20: Name Of Pf312 Module Components And Parts

Chapter 2 Configuration 2.5 Name of PF312 Module Components and Parts Status LED Address setup switch Transmission cable terminating resistor specification switch Transmission cable connector Reset switch Mode 2 setup switch Mode 1 setup switch Loader port (for maintenance) Figure 2-6 Name of components and parts •...

Page 21 2.5 Name of PF312 Module Components and Parts MODE1 Input byte (word) count INPUT 2Byte(1Word) Set only transmit word count. INPUT 4Byte(2Word) INPUT 8Byte(4Word) INPUT 16Byte(8Word) INPUT 32Byte(16Word) INPUT 64Byte(32Word) INPUT 128Byte(64Word) INPUT 244Byte(122Word) MODE1 Output byte (word) count OUTPUT 2Byte(1Word) Set only receive word count.

Page 22 • Reset switch (RESET) Press when the PF312 is abnormal or when initializing the PF312 independent of the controller. • Loader port (LOADER) PC (loader for use by TOSHIBA maintenance personnel) connector. (Normally not used.) model 3000 PROFIBUS Module User’s Manual...

Page 23: Configurator

2.6 Configurator 2.6 Configurator The PROFIBUS-DP configurator is used to monitor the PROFIBUS status, read/write cyclic data, and set parameters from a PC. Use the following configurator for PF311. Name : Sycon Manufacturer : HMS (Sweden) Supported OS : Windows 95/98/NT/2000 •...

Page 25: Specifications

Chapter 3 Specifications System specification Table 3-1 System specification Item Description Transmission path configuration Number of transmission 122 (maximum) stations (32 in each segment, expandable with repeater (up to 3)) Transmission cable RS-485 Shielded twisted pair cable Transmission speed 9.6 K to 12 Mbps Transmission code Manchester Modulation method...

Page 26 Chapter 3 Specifications PF311/PF312 module specification Table 3-2 PF311/PF312 module specification Description Item PF311 PF312 Connected device Integrated controller model 3000 Connection bus G3 I/O bus Number of connectable devices Up to 8 (total of PF311 and PF312) Service • Process data (cyclic data) •...

Page 27: Operation And Function

Chapter 4 Operation and Function 4.1 Cyclic Transmission The PF311 master cyclically reads input information from the slaves and cyclically writes output information to the slaves. The I/O area of the PF311 to the slaves are shown in the following table. Communication with slaves is performed by reading or writing to the specific address from the controller.

Page 28 Chapter 4 Operation and Function A conceptual diagram of cyclic transmission is shown below. The I/O address of the slave is set from the configurator. Controller Master Slave 100h Output Output module Output Output Output Output module Area Area Output Output module 200h...

Page 29: Cyclic Transmission Time

4.2 Cyclic Transmission Time 4.2 Cyclic Transmission Time The cyclic transmission time depends on the transmission speed, number of slaves, and the number of transmitted words. The time required to read from the PF311 output area, transmit to slave, receive from slave, and write to PF311 input area is shown in the following table.

Page 30

Chapter 4 Operation and Function Set the PF312. • Turn off MD4, 5, 6, and 7 of MODE2 setup switch. (When there is an error, hold transmission data and set both transmit and receive) • Set MODE1 setup switch to 6. (32 word transmission) See section 2.5 Install each module and connect cables.

Page 31: Transmission Parameter Setup

Chapter 5 Transmission Parameter Setup When using this module, you must set the transmission parameters using the PROFIBUS configurator, in addition to the controller setup and registration. Use the following PROFIBUS configurator: Name: PROFIBUS SYSTEM CONFIGURATOR HMS SYCON Manufacturer: HMS INDUSTRIAL NETWORKS AB Supported OS: Windows95, Windows98, WindowsNT4.0 with Service Pack3 or higher, Windows2000...

Page 33: Registration And Setup

Chapter 6 Registration and Setup This chapter describes the registration and setup method when connecting PROFIBUS to an S controller. The Engineering tool (Ver. 1.85 or later) is used for registration and setup. 6.1 Registration and Setup Procedure The basic registration and setup procedure is as follows. In order to register and setup PROFIBUS, you must create folders for the target systems, stations, and controllers.

Page 35: Module Control

Chapter 7 Module Control This chapter provides control information such as how to reset the PF311 or PF312 module and start transmission. 7.1 Module Control Information The information to control the PF311 or PF312 module is shown below. Table 7-1 Module control information Address 0040h PF module control enable flag (1W)

Page 36: Reset Pf Module

Chapter 7 Module Control 7.2 Reset PF Module This code is used to reset the PF module from an application when the PF module aborts for some reason. Refer to the PF module RAS information in the next chapter and perform the following procedure.

Page 37: Pf312 Transmission Word Count Setup

7.4 PF312 Transmission Word Count Setup 7.4 PF312 Transmission Word Count Setup This procedure is used to set the PF312 module transmission word count. It is valid only when setup from the controller is selected with the MODE2 setup switch (MD7, MD6=ON, ON).

Page 39: Ras Information

Chapter 8 RAS Information 8.1 PF311 information that can be referenced as I/O connection The PROFIBUS RAS information is divided into information that can be referenced as I/O connection and information that are referenced with MREAD instruction. Table 8-1 Information that can be referenced as I/O connection Address 0000h PF module status (1W)

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Chapter 8 RAS Information (2) Healthy counter Indicates the normal operating status of the PF module. Table 8-3 Healthy counter 0001h Healthy Counter Indicates that the PF module is operating normally. A 16-bit counter that is updated every 100 ms. Returns to 0 after FFFFh.

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8.1 PF311 information that can be referenced as I/O connection (a) Global error bit Indicates the PF module internal transmission control error status. Table 8-6 Global error bit Reserved(0) No data Auto clear Control → No data 1: 1 or more remote node is not exchanging data or is in error 0: Operating normally →...

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Remote Re-examine bus cable andre-examine remote node address Master not participating in token ring Master Re-examine master node address 50-53 Internal error Master Contact Toshiba No master parameter Master Download setup information again Master parameter error System Contact Toshiba design...

Page 43 8.1 PF311 information that can be referenced as I/O connection (g) Slave setup state Table 8-12 Slave setup states 0018h 001Fh The numbers in the above table are node numbers. → Remote node not set → Remote node set (h) Slave operating state Table 8-13 Slave operation states 0020h 0027h...

Page 44: Pf311 Information Referenced With Mread Instruction

Chapter 8 RAS Information 8.2 PF311 information referenced with MREAD instruction Table 8-15 Information referenced with MREAD instruction Address 0700h Firmware name (8W) 0708h Firmware version (8W) 07CBh Data exchange mode Master recognition 07CCh Device type DPM size 07CDh Reserved Field bus type (1) Firmware name The firmware name is specified as text string.

Page 45 8.2 PF311 information referenced with MREAD instruction (5) DPM size Table 8-20 DPM size DPM Size → 2 KB DPRAM is installed (6) Device type Table 8-21 Device error Device Type → PROFIBUS master (7) Fieldbus type Table 8-22 Fieldbus type FB Type →...

Page 46: Pf312 Information That Can Be Referenced As I/O Connection

Chapter 8 RAS Information 8.3 PF312 information that can be referenced as I/O connection Table 8-24 Information that can be referenced as I/O connection Address 0000h PF module status (1W) 0001h Healthy counter (1W) The address is the offset address (word address) from the beginning of the PF312 interface memory.

Page 47: Appendix

No error detected Controller accessing ACC(green) Controller not accessing The acyclic flashing pattern is as follows. If the error is not resolved after repeatedly downloading configuration parameters from the configurator, please contact Toshiba. Start 1 Start 2 LED-on LED-off 6F8C0921...

Page 48 Chapter 9 Appendix (2) PF312 LED status The station mode is indicated as follows with the ONL, OFL, DIAG, and ACC LEDs on the front of the module. Table 9-2 PF312 LED status Status and Cause Transmission module communicating normally (green) Transmission module not communicating Transmission module not communicating...

Page 49: Transmission Cable

9.2 Transmission Cable 9.2 Transmission Cable (1) Twisted pair cable connection structure and accessories Set terminating resistor switch Controller Slave Slave (TERM) ON at terminating node. Connector Connector Connector Twisted-pair cable Figure 9-2 Transmission cable Table 9-3 Transmission path accessories Manufacturer Name Type/Rating...

Page 50: Controller Interface Dpram Memory Map

Chapter 9 Appendix 9.3 Controller Interface DPRAM Memory Map (1) PF311 memory map Table 9-4 Controller interface DPRAM memory map Address Name Function 000h-0FFh PF module information PF module status, control information (256 words) 100h-1FFh Write data Output area to transmission module (256 words) 200h-2FFh Read data...

Page 51: Connectors

9.4 Connectors 9.4 Connectors (1) Configurator connector (only PF311) Table 9-6 Configurator connector Signal name Description INPUT Receive data OUTPUT Transmit data OUTPUT Data terminal ready Ref. Ground OUTPUT Request to send INPUT Clear to send Case Protective ground (2) PROFIBUS-DP connector Table 9-7 PROFIBUS-DP connector Signal name Description...

Page 52: Registration And Setup Procedure

Chapter 9 Appendix 9.5 Registration and Setup Procedure (Engineering Tool Ver. 1) 9.5 Registration and Setup Procedure (Engineering Tool Ver. 1) This chapter describes the registration and setup method when connecting PROFIBUS to an S controller. The Engineering tool (Ver. 1.85 or later) is used for registration and setup. An example of how to register and setup the PROFIBUS master module (PF311) is described below.

Page 53 9.5 Registration and Setup Procedure (Engineering Tool Ver. 1) (5) Register the station dmyPF side in the same manner. Figure 9-4 Hardware structure (station (dmyPF))

6F8C0921...

Page 54 Chapter 9 Appendix 9.5.2 Registering the LAN Register the LAN used by the system. (1) Double click [System Configuration] of the system (PROFIBUS) to open the configuration editor menu. Figure 9-5 Registering LAN (2) Double click [Connection diagram (LAN structure)] to open the connection configuration window.

Page 55 9.5 Registration and Setup Procedure (Engineering Tool Ver. 1) (3) Double click a module name under System (S) on the left side to open the LAN list window. From this list, select the LAN to use and click the [Connect] button. The LAN type appears in red in the module name column.

Page 56 Chapter 9 Appendix (4) Select the LAN to use under LAN (L) on the right side. Figure 9-8 Module connection Figure 9-9 Module connection (2) (5) Select [File (F)] - [Save (S)] to save the setting. The display color changes from red to normal.

Page 57 9.5 Registration and Setup Procedure (Engineering Tool Ver. 1) 9.5.3 Assigning Cyclic Data Assign PROFIBUS cyclic data to variables and I/Q registers in the S controller. This enables the S controller to process cyclic data as variables or I/Q registers. Use the Scan data symbol editor 2 to assign cyclic data to variables.

Page 58 Chapter 9 Appendix (2) Select [File] - [Assign Nodes to Blocks] to register the transmit block. Figure 9-11 Assigning nodes to blocks In the above example, 16 words from the beginning of the PF311 cyclic transmission transmit block (256) and 2 words from the PF311 module control information (64) of the station (PROFI) are registered as transmit block.

Page 59 9.5 Registration and Setup Procedure (Engineering Tool Ver. 1) (3) Select [File] - [Assign Signals to Points] to associate I/O word with I/O signal. Figure 9-12 Assigning signals to points In the above example, output words 1537 to 1540 are associated with output signals to PF311 and input words 1793 and 1794 are associated with input signals from PF311.

Page 60 Chapter 9 Appendix Associate the station dmyPF side in the same manner. Figure 9-13 Assigning signals to points (station (dmyPF)) When registration is complete, click the [Write Server] button to save the database. model 3000 PROFIBUS Module User’s Manual...

Page 61 9.5 Registration and Setup Procedure (Engineering Tool Ver. 1) (4) Select [File] - [Assign Points to Scans] to associate the transmission block word with output point to scan data. Figure 9-14 Assigning points to scans In the above example, transmit block words 1 and 2 are associated with PF311 transmit words 256 and 257.

Page 62 Chapter 9 Appendix Register the module control information related words in the same manner. Figure 9-15 Assigning points to scans (module control information) model 3000 PROFIBUS Module User’s Manual...

Page 63 9.5 Registration and Setup Procedure (Engineering Tool Ver. 1) Register the station (dmyPF) side cyclic transmission related words in the same manner. Figure 9-16 Assigning points to scans (station (dmyPF)) 6F8C0921...

Page 64 Chapter 9 Appendix Register the station (dmyPF) side module status related words in the same manner. Figure 9-17 Assigning points to scans (station (dmyPF), module status) model 3000 PROFIBUS Module User’s Manual...

Page 65 9.5 Registration and Setup Procedure (Engineering Tool Ver. 1) 9.5.4 Checking I/O Connection After creating the database, check that the assignment to I/Q register are as specified. Select [File] - [I/O Connections] to display the assignment status. Figure 9-18 Checking I/O connection 6F8C0921...

Page 67 3000 PROFIBUS Module User’s Manual 1st edition 28th May 2002 0921.0.0205 TOSHIBA CORPORATION SOCIAL INFRASTRUCTURE SYSTEMS COMPANY CONTROL & MEASUREMENT SYSTEMS DIVISION 1-1, Shibaura 1-chome, Minato-ku, Tokyo 105-8001, Japan Tel.:+81-3-3457-4900 Fax.:+81-3-5444-9268

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