

TOSHIBA

Toshiba V Series User Manual

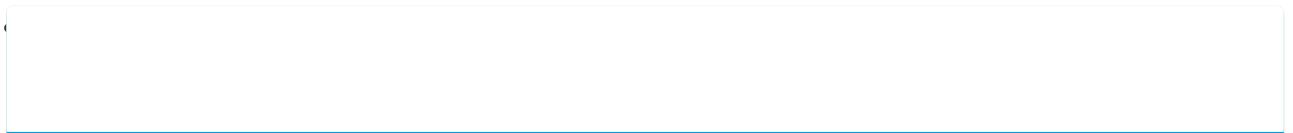
Integrated controller, loop controller

1
2
3
4
5
6
7
8
9
10
11
12
Table Of Contents
13
14
15
16
17

18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67

68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117

118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158



•

[Table of Contents](#)

-

Troubleshooting

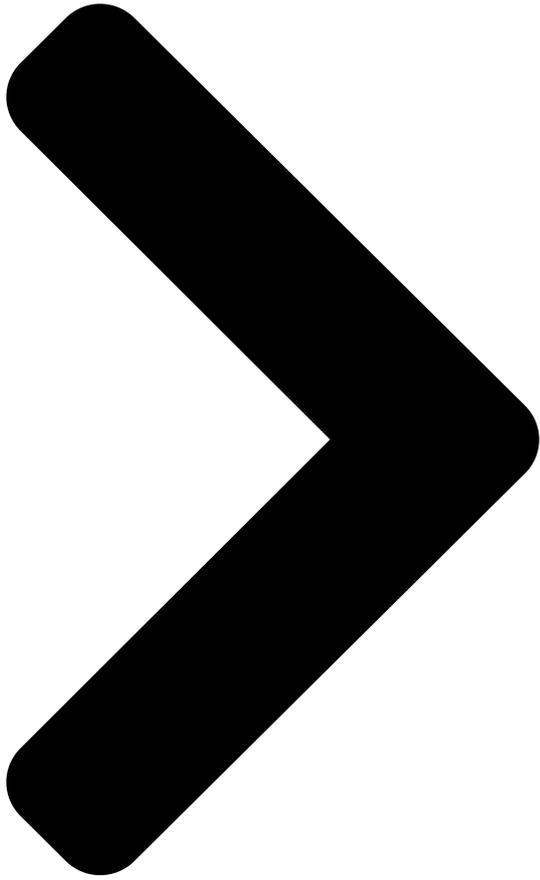
•

Bookmarks

Quick Links

[1 Cpu Module L1Pu11H](#)

[Download this manual](#)



6F8C1005 **TOSHIBA**

Integrated Controller V series

model 1000 Loop Controller

L1 User's Manual - Basic Hardware

(Ver.2)

Mar 20, 2002

TOSHIBA CORPORATION

Table of Contents

[Next Page](#)

1
2
3
4
5

Related Manuals for Toshiba V Series

[Controller Toshiba V Series User Manual](#)

Integrated controller ethernet module, en311 (258 pages)

[Controller Toshiba V Series User Manual](#)

Integrated controller (230 pages)

[Controller Toshiba V Series User Manual](#)

Sequence controllers (205 pages)

[Controller Toshiba V Series User Manual](#)

Admap-5m an712 module (150 pages)

[Controller Toshiba V Series User Manual](#)

Integrated controller (130 pages)

[Control Unit Toshiba V Series Operation Manual](#)

Integrated controller, ethernet module / ds connection module (126 pages)

[Controller Toshiba V Series User Manual](#)

Integrated controller (108 pages)

[Controller Toshiba V Series User Manual](#)

Integrated controller (98 pages)

[Controller Toshiba V Series Operation Manual](#)

Integrated controller, control network fl-net opc-2, module (96 pages)

[Control Unit Toshiba V Series User Manual](#)

Analog module (96 pages)

[Controller Toshiba 2000 User Manual](#)

V series integrated controller (76 pages)

[Controller Toshiba V Series User Manual](#)

Integrated controller (68 pages)

[Network Hardware Toshiba V Series User Manual](#)

(60 pages)

[Controller Toshiba V Series User Manual](#)

(50 pages)

[Controller Toshiba V Series User Manual](#)

Integrated controller, cif module (49 pages)

[Media Player Toshiba V Series Brochure](#)

Toshiba digital camera data specification (2 pages)

Summary of Contents for Toshiba V Series

[Page 1](#) 6F8C1005 Integrated Controller V series model 1000 Loop Controller L1 User's Manual - Basic Hardware (Ver.2) Mar 20, 2002 TOSHIBA CORPORATION...

[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 WARNIN Indicates a potentially hazardous situation which, if not avoided, 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 insert or drop metallic objects or clips Otherwise, it can cause malfunction or failure. into the equipment through its clearances. They can cause fire or accidents. 6. Safety Precautions on Disposal WARNING CAUTION Mandatory...

[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](#) Precautions for System Application Caution • System Redundancy The product is manufactured to the best possible quality, but is yet subject to failure due to accidental failure of electronic parts, for example. If your system requires a specially high degree of reliability, it is recommended that you provide such a system with product redundancy, or with other means of backup.

[Page 10](#) Be sure to strictly observe the precautions given herein to maintain the performance and functions of the model 10000 loop controller L1 of the Toshiba Integrated Controller V Series, and use it safely over a long period of time to come.

[Page 11](#) • Repacking When you are shipping parts for repairs, be sure to place internal parts in a case and package it in the same way as they were originally packaged in the factory. This is important to protect them from breakdown.

[Page 12](#) Describes daily inspection, periodic inspection, and others related to maintenance and inspection. Readers of the manual This manual is intended for the users of the model 1000 loop controller L1 of the Toshiba Integrated Controller V Series. Some knowledge of controller operation, but not controller specialist knowledge, is necessary for understanding the manual.

[Page 13: Table Of Contents](#)

CONTENTS 1 Overview1 1.1 System Configuration2 1.1.1 System Configuration .

[Page 14](#) CONTENTS 2.2.1 Models for mounting (TB511, TB521, TB522, UT5L12)72 2.2.2 Removing .

[Page 15](#) CONTENTS 5 Maintenance and Inspection ..97 5.1 Daily Check 97 5.2 Periodic Check .

[Page 17: Overview](#)

Chapter 1 Overview The L1 is the model 1000 loop controller of the Toshiba Integrated Controller V Series, consisting of a CPU module (L1PU11H/L1PU12H) and process I/O modules. The CPU module has a control operation capacity of 6K steps, and executes PID control of up to 8 loops, and various kinds of analog operation and sequence control.

[Page 18: System Configuration](#)

PS591 L1PU11H EN531 Engineering Tool TOSLINE-S20 LP Personal computer LP02 LP01 LD512 L1PU12H Figure 1-1 model 1000 L1 Configuration of the Integrated Controller V Series Table 1-1 Components Model Name General Specification Number L1PU11H,L1PU12H CPU module See this User's Manual.

[Page 19: Network Configuration](#)

1.2 Network Configuration 1.2 Network Configuration model 1000 permits system configuration using three types of networks: Ethernet, TOSLINE-S20LP and RS-485 computer link. A monitor and control network employs an Ethernet (10M) to transmit data between the monitor/controller (OIS/HI) and controllers. OIS1200 or a general-purpose personal computer is used as the host computer.

[Page 20: Connection With Intelligent I/O Units](#)

Chapter 1 Overview 1.3 Connection with Intelligent I/O Units model 1000 is compatible with horizontal terminal blocks, and allows connection of intelligent I/O units through an I/O bus. Table 1-2 shows a list of I/O units, and Table 1-3, accessory units. Table 1-2 List of I/O units Insulation Number of...

[Page 21: Connection To Engineering Tool](#)

1.4 Connection to Engineering Tool 1.4 Connection to Engineering Tool Connect the Engineering Tool to a CPU module using an RS-232C cable with an 8-pin modular jack connector. It can also be connected through Ethernet. In normal operation, the Engineering Tool can operate without this connection. Engineering Tool RS-232C...

[Page 22: Storing User Data](#)

Chapter 1 Overview 1.5 Storing User Data To store a user application, use the Maintenance Panel of the Engineering Tool. 1.5.1 Storing on FROM (Flash ROM) (Storing User Program Data) From the Maintenance Panel of the Engineering Tool, execute "Write on FROM". This saves the user application downloaded and extracted on SRAM and the parameters on FROM.

[Page 23: Names And Roles Of Products](#)

1.6 Names and Roles of Products 1.6 Names and Roles of Products Names and roles of the following products are described now. • CPU modules L1PU11H/L1PU12H (including terminal block unit TB521) • Ethernet modules EN531/EN531T (including terminal block unit TB522) • ...

[Page 24](#) Chapter 1 Overview Main unit (L1PU11H) Battery module Terminal block (TB521) Figure 1-6 Appearance of L1PU11H Module model 1000 Loop Controller L1 User's Manual - Basic Hardware...

[Page 25](#) 1.6 Names and Roles of Products Front view Figure 1-7 shows the front view of the L1PU11H unit. L1PU11H LED indicators (green) HARD SOFT Station address setting switches STNH STNL Main unit (L1PU11H) Power unit connector Switch 1 DLSW MCLR IO bus interface connector (side) TEST □...

[Page 26](#) Chapter 1 Overview (1) LED indicators Table 1-6 LED Indications on L1PU11H: Meanings of ON/Blinking/OFF Meaning Color Main unit board operation status Green HARD Hardware error Green SOFT Software error Green (2) Setting switches Table 1-7 Switch 1 Name and function Switch position DLSW Download setting switch DLSW...

[Page 27](#) 1.6 Names and Roles of Products Terminal Block and Pin Assignments The main unit and terminal block are connected with a connector. External wires are connected using M3 screws. The 24V power to other unit is supplied via the through connector. Table 1-9 TB1 (Terminal block: TB521) Terminal No.

[Page 28: Cpu Module L1Pu12H](#)

Chapter 1 Overview 1.6.2 CPU Module L1PU12H The L1PU12H module is a controller which controls up to 8 loops, the minimum unit being a loop I/O module provided with an I/O function for controlling one loop. The L1PU12H module also operates as loop master (terminal station/backup terminal station) or slave (general station) on a TOSLINE-S20LP transmission line, and has the function to transmit DI/DO, AI/AO, pulse inputs and other data obtained from

the field equipment through the IO bus to TOSLINE-S20LP.

[Page 29](#) 1.6 Names and Roles of Products System Configuration Diagram Ethernet Maximum configuration S20LP transmission line: 64 stations are connectable. IO bus transmission line: 16 units (LP01, LP02, AI06 ... DI01, DO01, but excluding the CPU) TOSLINE-S20LP LD512H L1PU L1PU LP01 LP01 AI06 AI06...

[Page 30](#) Chapter 1 Overview Front view Figure 1-10 shows the front view of the L1PU12 unit. L1PU12 LED indicators (green) HARD SOFT SCAN Station address Main unit (L1PU12H) setting switches STNH STNL Switch 1 Optical connector x 2(F07) DLSW MCLR TEST IO bus interface connector (side) Power unit TOOL...

[Page 31](#) 1.6 Names and Roles of Products (1) LED indicators Table 1-10 LED Indications on L1PU12H Meaning Color Main unit indications Main unit board operation status Green HARD Hardware error Green SOFT Software error Green S20LP indications Station hardware status Green Operation status (redundancy) Green SCAN...

[Page 32](#) Chapter 1 Overview (3) External connectors • OTR1/OTR2 (Optical connectors) These are interface connectors used in connecting TOSLINE-S20LP. The optical connector module is the two-way optical digital link ENQD55301 (made by Matsushita Electronic Parts Co., Ltd.), and the connectors are of the send/receive integrated type JIS-F07.

[Page 33: Ethernet Module En531](#)

Ethernet. The network configuration of a single 10BASE2 is supported. For notes on installation and wiring, see "Integrated Controller V Series Ethernet Installation and Wiring Manual" (6F8C0880). Figure 1-11 Appearance of EN531...

[Page 34](#) Chapter 1 Overview Front view of module Figure 1-12 shows a front view of the EN531 module. EN531 LED indicators (green) HLTH LINE Station address setting switches STNH STNL Ethernet connector Switch 1 DLSW NETP TEST □ /PU TOOL Maintenance communication port Name Station address setting switches...

[Page 35](#) 1.6 Names and Roles of Products (1) LED indicators Table 1-16 LED Indications on EN531 Meaning Color Station status Green HLTH Module normal Green LINE Ethernet transmission status Green (2) Setting switches Before mounting an EN531 module in the terminal block unit, set the switches determining the host ID of the EN531 module and its operation mode.

[Page 36](#) Chapter 1 Overview Table 1-18 Setting switches Name and Function of Switch Switch Position DLSW DLSW Normal setting Download setting switch Download NETP NETP Normal setting Network parameter setting mode Parameter setting TEST TEST Normal setting Test program mode Test program mode - / PU - / PU Tool selection...

[Page 37](#) 1.6 Names and Roles of Products Ethernet Module EN531T The Ethernet module EN531T has a function to connect an L1PU11H to Ethernet (10BASE-T), one of local area networks. The EN531T is paired with the main module L1PU11H to transmit DI/DO, AI/AO and pulse inputs, and other data obtained from sensors and actuators to the Ethernet.

[Page 38](#) Chapter 1 Overview Front view of module Figure 1-14 shows a front view of the EN531T. EN531T LED indicators (green) HLTH LINE Station address setting switches STNH STNL Ethernet connector Switch 1 DLSW NETP TEST □ /PU TOOL Maintenance communication port Name Station address setting switches (STNH, STNL) Station address setting See (2) Setting...

[Page 39](#) 1.6 Names and Roles of Products The functions are the same as those of the EN531 except for the Ethernet connector different in form from that of the EN531. (1) LED indicators Table 1-20 EN531T LED Indications and ON, OFF, Blink Conditions Meaning Color Station status...

[Page 40](#) Chapter 1 Overview Table 1-22 Setting Switches Name and Function of Switch Switch Position DLSW DLSW Normal setting Download setting switch Download NETP NETP Normal setting Network parameter setting Network parameter setting mode mode TEST TEST Normal setting Test program mode Test program mode - / PU - / PU...

[Page 41: Terminal Block Tb522](#)

1.6 Names and Roles of Products 1.6.4 Terminal Block TB522 Use an EN531/EN531T module to connect an L1PU11H module to Ethernet. L1PU11H and EN531/EN531T modules can be mounted in the terminal block TB522. L1PU11H connector EN531/EN531T connector RS-485 terminator setting switch IO bus interface connector Power unit...

[Page 42](#) Chapter 1 Overview Table 1-24 Signal Arrangement on Terminal Block Pin No. Signal Pin No. Signal MON485(-) P24(+24V) IOBUS(+) COM(0V) IOBUS(-) WDTOUT TIMER IN COM(0V) N.C. N.C. N.C. N.C. N.C. MON485(+) N.C. P24(+24V) : Connect the (+) wire of an external power supply (24 VDC). COM(0V) : Connect the (-) wire of an external power supply (24 VDC).

[Page 43: Loop I/O Module Lp01/Lp03](#)

1.6 Names and Roles of Products 1.6.5 Loop I/O module LP01/LP03 The loop I/O module LP01/LP03 is used in combination with the CPU module L1PU12H (or L1PU11H). It has a process I/O processing function and a RAS function which are required for loop control.

[Page 44](#) Chapter 1 Overview Front View M3 screw terminals (12P) TOSHIBA LED indicators LP01 RUN Green ALM Red Loop I/O unit (LP01) Station address setting switch ADDRESS IO bus connector Terminal block (UT5L12) 3 screw terminals (12P) (1) LED indicators Table 1-25 LED Indications on LP01/LP03: Meanings of ON/Blinking/OFF...

[Page 45](#) 1.6 Names and Roles of Products LP01/LP03 Terminal Block (UT5L12) Table 1-26 shows signal assignments on the LP01 terminal block. Table 1-26 LP01/LP03 Terminal Block Signal Assignments Pin No. Signal Analog Input 1 (AI1) Analog Input 2 (AI2) Analog Input 3 (AI3) Analog Input 4 (AI4)

[Page 46: Loop I/O Module Lp02/Lp04](#)

Chapter 1 Overview 1.6.6 Loop I/O module LP02/LP04 The loop I/O module LP02/LP04 is used in combination with the CPU module L1PU12H (or L1PU11H). It has a process I/O processing function and a RAS function which are required for loop control. PID control processing is performed by the CPU module L1PU12H (or L1PU11H).

[Page 47](#) 1.6 Names and Roles of Products Front View M3 screw terminals (12P) TOSHIBA LP02 LED indicators RUN Green ALM Red Station address setting Loop I/O unit (LP02) switch ADDRESS IO bus connector Terminal block (UT5L12) M3 screw terminals (12P) (1) LED indicators...

[Page 48](#) Chapter 1 Overview LP02/LP04 Terminal Block (UT5L12) Table 1-28 shows signal assignments on the LP02 terminal block. Table 1-28 LP02/LP04 Terminal Block Signal Assignments Pin No. Signal Analog Input 1 (AI1) Analog Input 2 (AI2) Analog Input 3 (AI3) Analog Input 4 (AI4) SC(Common) Analog Output 1...

[Page 49: Loop Display Unit Ld512H](#)

1.6 Names and Roles of Products 1.6.7 Loop Display Unit LD512H The loop display unit LD512H is used to monitor, display, and manual operation of loop control. It can operate and monitor the CPU module L1PU12H (L1PU11H) of the L1. It is the DIN size (72 x 144 mm) and employs LED bar graph indicators.

[Page 50](#) Connected to the modular connector Shows the object of digital on the rear. indication. (PV, SV or MV) Keep the cap on when it is not used. TOSHIBA Figure 1-19 Front View of LD512H Modular connector Address setting switch Connected to the tool connector on the front.

[Page 51: Ac Power Module Ps591](#)

1.6 Names and Roles of Products 1.6.8 AC power module PS591 The AC power module PS591 supplies AC power to the L1. It receives 100/240 VAC and outputs a power of 24 VDC 2 A maximum. Mount the AC power module on the leftmost position of the L1, then it supplies 24 VDC to the individual units through the terminal block connectors.

[Page 52](#) Chapter 1 Overview Front view PS591 POWER LED indicator Power ON normal: Green Power unit (PS591) Terminal block (TB511) M3 screw terminals (8P) Figure 1-22 Front View of PS591 Module Table 1-29 LED Indications on PS591: Meanings of ON/Blinking/OFF LED

(Color) Meaning ON/OFF Condition...

[Page 53: Software Functions](#)

1.7 Software Functions 1.7 Software Functions 1.7.1 Loop display indication and setting function
The display setting function using LD512H is described below. For information on application programs, refer to the manual for the Engineering Tool. A loop display unit may be connected to L1 for display setting for each loop. Up to 8 loop display units (LD512H) can be connected one CPU module.

[Page 54: Display Function](#)

Chapter 1 Overview 1.7.2 Display function The loops to be displayed on the front panel are subject to the LD512H and CPU module (default: address switch). The LD512H provides a multi-loop display (up to 8 loops). Multi-loop display refers to a mode in which loop display can be changed using the switches on the LD512H.

[Page 55](#) 1.7 Software Functions (4) LED indications • HALT LED (HLT) The HALT LED remains unlit while the LD unit is operating normally. It lights or blinks under the following conditions. Table 1-31 HALT LED LED status Possible cause • LD unit CPU module error •...

[Page 56: Setting Function](#)

Chapter 1 Overview • SELECT LED This LED lights in SELECT mode, and goes out in NORMAL mode. (These modes will be described later.) 1.7.3 Setting function (1) Control mode switching (C, A, M switches) The control mode of the display loop can be changed using the C, A, and M switches. switch: M mode (manual mode) For manual operation with the manual operation switches switch: A mode (auto mode)

[Page 57](#) 1.7 Software Functions When this switch is pressed at the same time as the manual operation switches or SV switch, the change rate is set to FAST. This switch, used alone, changes the mode from SELECT to NORMAL or vice versa. The SELECT and NORMAL modes allow selection of two or more functions with the single switch (FAST/SEL) as follows.

[Page 58](#) Chapter 1 Overview (6) Setting time chart In a manual operation to make preferential display of a bar graph data from the L1, the display data does not involve that part of the button operation from the transmission of operation data from the LD unit to its reception in the first display data transmission cycle so that the bar graph appears as if there was a decrease in the button operation.

[Page 59](#) 1.7 Software Functions (7) Display, operation Display and loop numbers are changed using the switches on the LD512H. [Status transition] [Status transition] F/S key Fast operation Operational mode MV/SV key ON mode F/S key MV/SV key MV/SV key MV/SV key MV/SV key F/S key FAST ON mode...

[Page 60: Tosline-S20Lp Message Transmission](#)

Chapter 1 Overview 1.7.4 TOSLINE-S20LP message transmission [S20 message transmission (Computer link binary)] The L1 function of S20 message transmission is described below. The T3H/S2T can access the CPU module L1PU12H for its data through the TOSLINE- S20LP. The T3H, for example, sends a write/read request to the L1 using a SEND/RECV instruction.

[Page 61](#) 1.7 Software Functions L1 register assignments The computer-link registers used for the L1 are as follows. (The areas accessible from the T3H/S2T by SEND/RECV instruction are shown in the table below.) Register/device assignments Symbol Function Word address Description relative to L1 Input register XW000 to XW255 Input value to I/O module (EA9)

[Page 62](#) Chapter 1 Overview • Input registers (XW)/input devices (X) Input register (XW) assignments are shown below. In the R/W column, the letter R means readable only and the term R/W, readable and writable. Register Direct Description representation XW 0000 %MW9. 0 Address 0: I/O module receive buffer Transmission header □...

[Page 63](#) 1.7 Software Functions • Output registers (YW) Output register (YW)/output device (Y) assignments are shown below. In the R/W column, the letter R means readable only and the term R/W, readable and writable. Register Direct Description representation YW 0000 %MW9. 512 Address 0: I/O module send buffer Transmission header □...

[Page 64](#) Chapter 1 Overview Note: In using SEND/RECV instructions by S2T, T3H, WX/YW will be the same register type as in the partner station. To access a YW of the L1 module, therefore, specify the register head number of the partner station as follows: (register number + 512).

[Page 65](#) 1.7 Software Functions • Auxiliary registers (RW) Auxiliary register (RW)/special relay (R) assignments are shown below. In the R/W column, the letter R means readable only and the term R/W, readable and writable. Register Direct Description representation RW 0000 %MW7. 0 PV_DATA[0] PV value RW 0001...

[Page 66](#) Chapter 1 Overview • Link registers (W) Link register (W) assignments are shown below. In the R/W column, the letter R means readable only and the term R/W, readable and writable. Register Direct notation Description 0000 %MW10. 0 TOSLINE-S20LP scan data User definede □...

[Page 67](#) 1.7 Software Functions • Data registers (D) Data register (D) assignments are shown below. In the R/W column, the letter R means readable only and the term R/W, readable and writable. Register Direct Description representation D 0000 %MW6. 0 PV_PARA Header □...

[Page 68](#) Chapter 1 Overview D 7184 %MW6. 7184 LP_PARA Header □ □ D 7199 %MW6. 7199 D 7200 %MW6. 7200 LP_PARA[0] Output point No. D 7201 %MW6. 7201 D 7202 %MW6. 7202 Controlled PV No. D 7203 %MW6. 7203 MSIG Output signal type D 7204 %MW6.

[Page 69](#) 1.7 Software Functions 7648 %MW6. 7648 LP_PARA[7] □ □ 7711 %MW6. 7711 7712 %MW6. 7712 PB_PARA Header □ □ 7727 %MW6. 7727 7728 %MW6. 7728 PB_PARA[0] TAG[0] Tag No. 7729 %MW6. 7729 7730 %MW6. 7730 TAG[1] Tag No. 7731 %MW6. 7731 7732 %MW6.

[Page 70](#) Chapter 1 Overview D 8670 %MW6. 8670 VAL[7].Y D 8671 %MW6. 8671 D 8672 %MW6. 8672 VAL[8].X D 8673 %MW6. 8673 D 8674 %MW6. 8674 VAL[8].Y D 8675 %MW6. 8675 D 8676 %MW6. 8676 VAL[9].X D 8677 %MW6. 8677 D 8678 %MW6.

[Page 71](#) 1.7 Software Functions • Filter registers (FW) Filter register (FW) assignments are shown below. In the R/W column, the letter R means readable only and the term R/W, readable and writable. Register Direct Description representation FW 0000 %MW8. 0 R_PARA Header □...

[Page 72: Setting Ethernet Module](#)

Chapter 1 Overview 1.8 Setting Ethernet Module Use the operation mode setting switches and the host ID setting switches to set network parameters. For details of the setting procedures, see Table 1-17 "Host ID Setting" and Table 1-18 "Setting switches" . For EN531/EN531T, set the following network parameters.

[Page 73: Setting Host Ids](#)

1.8 Setting Ethernet Module 1.8.2 Setting host IDs Set a host ID using the host ID setting switches. The available range for a host ID is 01H to 3EH. However, the network ID has precedence over the value specified by the host ID setting switches if "Set from Tool"...

[Page 74](#) Chapter 1 Overview With one EN5 module, you can select and register one of these 15 addresses as desired. Register an address to an EN5 module using the Engineering Tool. For the registering procedures, see "Setting with Engineering Tool". Group A Group B Controller Controller...

[Page 75: Setting With Engineering Tool](#)

1.8 Setting Ethernet Module 1.8.4 Setting with Engineering Tool Use the Engineering Tool for setting parameters in an EN5 module. Confirmation of network parameters Set network parameters for the network where an EN5 module is connected. When "Set from Tool" is selected for IP address type setting, start the Engineering Tool and register them, taking the following steps.

[Page 76](#) Chapter 1 Overview Set as follows: (1) Start the Engineering Tool. (2) Start the Configuration Editor [Hardware Configuration] of Controller A. The screen where the hardware configuration of Controller A is registered is displayed. For registering hardware configuration, see "Engineering Tool - User's Manual". Figure 1-28 Hardware Configuration Screen (3) Select EN531, and execute [Edit (E)] and [Set Parameters (P)].

[Page 77](#) 1.8 Setting Ethernet Module (4) Register parameters in accordance with the system configuration diagram. When the IP address type is "TOSDIC-CIE 1200", register 192.0.0.xx (where xx is a host ID, which is 2 in this case), and subnet mask 255.255.255.192. Figure 1-30 EN531 Parameter Window (2) (5) When registration is completed, execute [File (F)] and [Write (W)].

[Page 78](#) Chapter 1 Overview (7) Double-click Connection Configuration Diagram (LAN Configuration) to open it. Figure 1-32 Connection Configuration Diagram. (8) Double-click No. 1 in the module name column under System (S) to open the module connection window, and register the module type to be connected. In this case, select "EtherLAN (Ethernet LAN (single))".

[Page 79](#) 1.8 Setting Ethernet Module (9) Click the button <Connect (C)> to register it. The result of registration will be as shown below. Figure 1-34 Connection Configuration Diagram (10) Register LAN (L). Select the LAN connected now under LAN (L), double-click the No.1 in the module name column to open the module connection window, and register the module type to be connected.

[Page 80](#) Chapter 1 Overview (11) Click the button <Connect (C)> to register the controller. The result of the registration will be as shown below. Figure 1-36 Connection Configuration Diagram (LAN Configuration) (12) Execute [File (F)] and [Save (S)] to save the information registered. (13) Confirm the current EN5 module information.

[Page 81](#) 1.8 Setting Ethernet Module (14) When the above have been registered, check that the network information for the appropriate Ethernet module can be read out from the serial communication port (TOOL). Start the Configuration Editor [Hardware Configuration] for Controller A to open the window where the hardware configuration of Controller A was registered.

[Page 82](#) Chapter 1 Overview (16) When the EN5 module information is successfully read from the serial communication port, confirm that the EN5 module information can be read through Ethernet. First, disconnect the RS-232C cable to confirm that the information was read through Ethernet.

[Page 83: Setting Network Parameters](#)

1.8 Setting Ethernet Module 1.8.5 Setting Network Parameters The types of network parameters include IP address, subnet mask and multicast address. The registered parameters can be downloaded to an Ethernet unit as described below. Preparations on the Ethernet Unit Side Connect the Engineering Tool to the serial communication port (TOOL) of the Ethernet unit with an RS-232C cable.

[Page 84](#) Chapter 1 Overview (3) Upon completion of registration, execute [File (F)] and [Write (W)]. (4) Return to the Configuration Editor [Hardware Configuration] for Controller A, and execute [File (F)] and [Save (S)]. (5) Download the parameters just set. To download the parameters, execute [File (F)] and [Download (D)] from the Set Parameter window.

[Page 85: Setting Default Gateway Ip Address](#)

1.8 Setting Ethernet Module 1.8.7 Setting default gateway IP address (router IP address) (1) To use a default gateway (router), set a default gateway IP address (router IP address). Only one default gateway IP address can be set. The default gateway can be used only if an IP address type is set from the Engineering Tool.

[Page 87: Mounting, Dismounting And Connection](#)

- Be careful not to lose any screws removed. Do not drop any screw in the main unit.
- Consult your nearest TOSHIBA service shop if any error or failure has occurred.
- Be careful not to let your hands injured by the sharp projections of the printed circuit boards.

[Page 88: Mounting And Removing Terminal Block Unit](#)

Chapter 2 Mounting, Dismounting and Connection 2.2 Mounting and Removing Terminal Block Unit 2.2.1 Models for mounting (TB511, TB521, TB522, UT5L12) Mount the TB511, TB521 (TB522), UT5L12, and intelligent I/O from left to right. Observe the following procedures in mounting the terminal block units. (1) Fix DIN rails on the cabinet using screws.

pair cable 100 m max. Twisted pair cable 100 m max. L1PU11H EN531T Figure 2-11 Example of 10BASET Network Configuration 6F8C1005...

[Page 100: Modules](#)

Chapter 2 Mounting, Dismounting and Connection 2.10 Restrictions on the Number of Connecting Modules The 24 V power and I/O bus and GND signals to be applied from one module to another are connected through the connectors on the terminal blocks of the individual modules. The connectors have a current capacity of 2 A maximum.

[Page 101: Checking Switches](#)

Chapter 3 Checking Switches 3.1 Checking Switches This chapter describes the switches on each module. CPU module (L1PU11H) • Station address setting switches Set station addresses with these switches. Set higher digits with the upper switch STNH, and lower digits with the lower switch STNL. Do not duplicate addresses within a system.

[Page 102: Start](#)

Chapter 3 Checking Switches • L1PU11H → Computer link used → Located at the end of the link → ON Not located at the end of the link → OFF Computer link not used → ON • L1PU12H used → ON • TB522 used → ON 3.2 Start Start the system observing the following procedures.

[Page 103: Setting By Engineering Tool](#)

3.3 Stopping 3.2.3 Setting by Engineering Tool (1) Connect a PC and a CPU module using an RS-232C or Ethernet cable. When using the L1PU12H, set the Engineering Tool port select switch to the position CPU. (2) Start the Engineering Tool on the PC and set it as shown below for downloading to the CPU module.

[Page 104: Program Management](#)

Chapter 3 Checking Switches 3.4 Program Management 3.4.1 Kinds of programs The L1 has main scan programs. Scan programs are repeated on a specific cycle, which can be set as desired. Table 3-1 Kinds of Programs Type of scan Purpose Entry No.

[Page 105: Program Management](#)

3.4 Program Management 3.4.3 Program management The programs, user functions, and user function blocks are managed in a unit called POU (Program Organization Unit) by the program proper consisting of instruction words. Each program, user function, or user function block uses one POU. The program proper is arrayed in the code memory, which has a structure divided into memory blocks (each consisting of 512 bytes).

[Page 107: Troubleshooting](#)

4.1 Indications of Operation Status LEDs The indications of LEDs on each module and their lighting conditions are shown below. For details of errors, connect the Engineering Tool for the Integrated Controller V Series, and check the alarm indicators and trace indicators.

[Page 108](#) Chapter 4 Troubleshooting Table 4-2 LED indicators on L1PU12H (Main Indications)
Indication ON Conditions Remedy – Main unit Online (Board operating board normally)
operation – – Blink status Waiting for download Download applications from Tool. To start control, select RUN mode from the Tool, or turn power back on. HALT To start control, select RUN mode from the Tool, or turn power back on.

[Page 109](#) 4.1 Indications of Operation Status LEDs Table 4-3 S20LP Indicators Indication ON Conditions Remedy – Station hardware status Normal Self-diagnosis error upon power-on Too frequent interruptions Station program out of control Station address setting error Operation status Online (system online) (redundancy) Offline (standby)/Rundown –...

[Page 110: Trace Function](#)

– Rundown OFF An error Replace the module. occurred. Contact our service station. Blinking ON Blinking or ON For maintenance Contact TOSHIBA disable service shop. mode – – DL mode ON OFF or blinking For maintenance 4.2 Trace Function The CPU module executes self-diagnosis by hardware or software.

[Page 111: Actions To Be Taken Upon Operation Of The Ps591](#)

(3) Turn input power back on and check that the power unit operates normally. Turn off input power immediately if the power LED goes out or if abnormal smell, smoke or fire is produced from the power unit. Then contact your nearest TOSHIBA service station. 6F8C1005...

[Page 113: Maintenance And Inspection](#)

Chapter 5 Maintenance and Inspection 5.1 Daily Check Check the following items while the system is operating. • AC power module (PS591 or an external power module) Check that the power output lamp "POWER" is ON. If it is OFF, check the output voltage and adjust it.

[Page 114](#) Chapter 5 Maintenance and Inspection • Checking input power terminal screw Check that it is not loose. Retighten the screw if loose. Warning • Before checking, make sure that input power has been turned off (the switch on the incoming/distributing unit is in the OFF position).

[Page 115: Expendable Parts](#)

5.3 Expendable Parts 5.3 Expendable Parts Check the following items periodically (about every 6 months), Also, check the same if ambient conditions have changed. 5.3.1 Replacing battery modules The lithium battery in the battery module mounted on a CPU module terminal block is an expendable part, and requires replacement.

[Page 116](#) Chapter 5 Maintenance and Inspection (4) Close the case Fasten the hooks securely. hooks Figure 5-4 (5) Place the battery case back into the module. Figure 5-5 It is recommended that the batteries be replaced every two years (standard) under normal ambient conditions.

[Page 117: Backup Period](#)

5.3 Expendable Parts Mounting and removing battery modules Warning • Remove battery modules at periodic inspection/servicing. • The memory data may be lost if the battery is left out of place for more than five minutes with no power supplied to the CPU. •...

[Page 118: Module Replacement \(En531/En531T\)](#)

Chapter 5 Maintenance and Inspection 5.4 Module Replacement (EN531/EN531T) Observe the following precautions when removing and inserting a card. When an EN5 module has been replaced, switch power off, wait for about 5 minutes, then switch power back on. If power is switched back in without waiting for 5 minutes, the EN5 module cannot be recognized by the OIS model 1000 Loop Controller L1 User's Manual - Basic Hardware...

[Page 119: A Table Of Specifications](#)

Appendix A Table of Specifications A.1 L1PU11H Hardware Specifications Table A-1 Environmental Specifications Item External specification Remarks Operating 0 to 55 ambient temperature Storage -25 to 70 temperature Relative humidity 10% to 90% (with no condensation) Dust 0.3mg/m or less concentration Corrosion No corrosive gas shall be present.

[Page 120](#) Appendix A Table of Specifications Table A-2 IO Bus Specifications Item Specifications Remarks Topology Multi-drop 1 channel Transmission IEEE 802.4 compliant Interface RS-485 (IO BUS) Transmission rate 19.2 Kbps/375 Kbps Selectable (Transmission data size is fixed, 22 bytes, at the 375 by software Kbps rate.) Number of...

[Page 121: L1Pu12H Hardware Specifications](#)

A.2 L1PU12H Hardware Specifications A.2 L1PU12H Hardware Specifications Table A-5 Environmental Specifications Item Specifications Remarks Operating ambient 0 to 55 temperature Storage -25 to 70 temperature Relative humidity 10% to 90% (with no condensation) Dust concentration 0.3mg/m or less Corrosion No corrosive gas shall be present.

[Page 122](#) Appendix A Table of Specifications Table A-6 S20LP Specifications Item Specifications Remarks Topology Optical double loop connection if one station fails Transmission code Differential Manchester Code Modulation Baseband Transmission rate 2 Mbps Connector F07 connector (JIS) Number of Max. 64 stations connectable stations Transmission line...

[Page 123](#) A.2 L1PU12H Hardware Specifications Table A-8 Engineering Tool Connecting Port

Specifications Item Specifications Remarks Topology 1 to 1 1 channel Transmission Baseband Interface RS-232C (Engineering tool port) Transmission 9600 bps rate Transmission Max. 15 m line length Transmission Shielded cable cable Connecting Modular connector (8-pin)

[Page 124: En531/En531T Hardware Specifications](#)

Appendix A Table of Specifications A.3 EN531/EN531T Hardware Specifications Table A-10 Environmental Specifications(EN531/EN531T) Item Specifications Remarks Operating ambient 0 to 55 temperature Storage -25 to 70 temperature Relative humidity 10% to 90% (with no condensation) Dust concentration 0.3 mg/m or less Corrosion No corrosive gas shall be present.

[Page 125](#) A.3 EN531/EN531T Hardware Specifications Table A-11 Ethernet Specifications(EN531) Item Specifications Remarks Topology Bus type Transmission IEEE 802.3 ETHERNET (10BASE2) compliant Modulation Baseband Transmission rate 10 Mbps Connector BNC connector (JIS) Number of EN531: 8 nodes/system For OIS 1200 connectable nodes or OIS DS system Transmission line...

[Page 126](#) PCMP: Port No. 10000 Transmission line diagnosis: Port No. 48000 Note 1: PCMP is a Toshiba protocol. Note 2: Valid only for EN5 module Ethernet basic software version V2.00 or up Note 3: Transmission data must be checked for transmission at application level.

[Page 127: Lp01 Hardware Specifications](#)

A.4 LP01 Hardware Specifications A.4 LP01 Hardware Specifications Table A-15 LP01 Hardware Specifications Item Specifications Input Analog input • 1 to 5 VDC at 4 points Accuracy: $\pm 0.2\%$ Input resistance: 1 M Ω or higher (including the resistance at power off) Input break detecting function: Down scale Digital input •...

[Page 128: Lp02 Hardware Specifications](#)

Appendix A Table of Specifications A.5 LP02 Hardware Specifications Table A-16 LP02 Hardware Specifications Item Specifications Input Analog input • 1 to 5 VDC at 4 points Accuracy: $\pm 0.2\%$ Input resistance; 1 M Ω or higher (including the resistance at power off) Input break detecting function: Down scale Digital input...

[Page 129: Lp03 Hardware Specifications](#)

A.6 LP03 Hardware Specifications A.6 LP03 Hardware Specifications Table A-17 LP03 Hardware Specifications Item Specifications Input Analog input • 1 to 5 VDC at 4 points Accuracy: $\pm 0.2\%$ Input resistance: 1 M Ω or higher (including the resistance at power off) Input break detecting function: Down scale Digital input •...

[Page 130: Lp04 Hardware Specifications](#)

Appendix A Table of Specifications A.7 LP04 Hardware Specifications Table A-18 LP04 Hardware Specifications Item Specifications Input Analog input • 1 to 5 VDC at 4 points Accuracy: $\pm 0.2\%$ Input resistance; 1 M Ω or higher (including the resistance at power off) Input break detecting function: Down scale Digital input...

[Page 131: Ld512H Hardware Specifications](#)

A.8 LD512H Hardware Specifications A.8 LD512H Hardware Specifications Table A-19 LD512H Hardware Specifications Item Specifications Remarks Environmental Operating ambient 0 to 55 conditions temperature Storage -25 to 70 temperature Relative humidity 10% to 90% (with no condensation) Dust concentration 0.3 mg/m or less Corrosion No corrosive gas shall be present.

[Page 132](#) Appendix A Table of Specifications Table A-19 LD512H Hardware Specifications Item Specifications Remarks Power supply Rated voltage DC24 V +10%, -15% Retentive power (Reference interruption values) Power 8 W or less consumption Rush current maximum Fuse Resistance fuse provided Insulation As measured with a 500 VDC megger resistance 50 M Ω ...

[Page 133: Ps591 Hardware Specifications](#)

A.9 PS591 Hardware Specifications A.9 PS591 Hardware Specifications Table A-20 PS591 Hardware Specifications Item Specifications Remarks Environmental Operating ambient 0 to 55 conditions temperature Storage temperature -25 to 70 Relative humidity 10% to 90% (with no condensation) Dust concentration 0.3 mg/m or less Corrosion resistance No corrosive gas shall be present.

[Page 135: Software Specifications](#)

Appendix B Software Specifications B.1 L1PU11H/L1PU12H Software Specifications Table B-1 L1PU11H/L1PU12H Software Specifications Item Specifications Control mode RUN/HALT/ERROR Programming language ICE61131-3 compliant Program capacity 64 POU Program type Task type 1 Program processing Control loop/ 8 loops/6k steps capacity Program capacity Performance 1 loop/100 ms, 8 loops/500 ms...

[Page 137: C External Views](#)

Appendix C External Views L1PU11H L1PU11H FBATI TB521 35.4 (In millimeters) Figure C-1 Dimensions of L1PU11H Unit L1PU12H L1PU12H FBATI TB521 35.4 (In millimeters) Figure C-2 Dimensions of L1PU12H Unit 6F8C1005...

[Page 138](#) Appendix C External Views LP01 LP01/LP02/LP03/LP04 UT5L12 35.4 (In millimeters) Figure C-3 Dimensions of LP01/LP02/LP03/LP04 Clamps FAST PV SV MV TOOL In millimeters Panel cutting dimensions $\square 0.7$, $\square 0$ (72.3×N – 4) $\square 1.0$, $\square 0$ Single mounting Mounting two or more units Note 1: Mount units more than 50 mm apart from each other in vertical directions.

[Page 139](#) L1PU11H EN531 HARD HLTH LINE L1PU11H SOFT EN531 STNH STNH STNL STNL DLSW DLSW MCLR NETP TEST TEST \square /PU \square /PU TOOL TOOL FBATI BATTERY MODULE TB522 35.4 (In millimeters) Figure C-5 Dimensions of Ethernet Module (EN531 + L1PU11H) PS591 PS591 TB511...

[Page 140](#) Appendix C External Views L1PU11H EN531 HARD HLTH LINE L1PU11H SOFT EN531 STNH STNH STNL STNL EN531T module DLSW DLSW MCLR NETP TEST TEST \square /PU \square /PU TOOL TOOL FBATI BATTERY MODULE TB522 35.4 (In millimeters): Figure C-7 Dimensions of Ethernet Module (EN531T + L1PU11H) model 1000 Loop Controller L1 User's Manual - Basic Hardware...

[Page 141: D Trace Information](#)

Appendix D Trace Information For trace details on the EN531 unit, see the Ethernet RAS User's Manual (6F8C????) for the Integrated Controller V Series. 6F8C1005...

[Page 142](#) Appendix D Trace Information model 1000 Loop Controller L1 User's Manual - Basic Hardware...

[Page 143](#) 6F8C1005...

[Page 144](#) Appendix D Trace Information model 1000 Loop Controller L1 User's Manual - Basic Hardware...

[Page 145](#) 6F8C1005...

[Page 146](#) Appendix D Trace Information model 1000 Loop Controller L1 User's Manual - Basic Hardware...

[Page 147](#) 6F8C1005...

[Page 148](#) Appendix D Trace Information model 1000 Loop Controller L1 User's Manual - Basic Hardware...

[Page 149](#) 6F8C1005...

[Page 150](#) Appendix D Trace Information model 1000 Loop Controller L1 User's Manual - Basic Hardware...

[Page 151: E Return Code List](#)

Appendix E 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 (6F8C????). USND_T/URCV_T Return Code List Return Value Description -5000...

[Page 152](#) Appendix E 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 BIND EBADF Socket identifier not valid...

[Page 153](#) Communication Return Description Procedure Value SELECT EBADF One of the socket identifiers specified by bit mask is incorrect. 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...

[Page 155: Index](#)

INDEX Index NUMBER 10BASE2 Host ID setting switch Back-up period IEC61131-3 Battery module Indication IOBUS IP address CIEMAC1200 Control mode Current consumption L1PU11H LED indicator 112, 116 L1PU12H L1PU12H LED indicator LED indicators 91, 92, 93 DIN rail LP01 Download LP01 LED indicator LP02 LP02 LED indicator...

[Page 156](#) INDEX Station address setting switches Operation mode Operation trace Optical connector Optical double loop Terminator switch Output TOSLINE-S20LP 1, 13 Transmission trace PID control Power consumption 103, 105, Voltage 103, 105, 108 108, 111, 117 Power supply 1, 111, 112 Program capacity Program processing capacity Weight...

[Page 157](#) 1000 Loop Controller L1 User's Manual - Basic Hardware (Ver.2) 1st edition 20th Mar 2002 1005.0.0203 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 □ TOSHIBA Corporation 2002 All Rights Reserved.

This manual is also suitable for:

[V10001000](#)