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You can read the recommendations in the user guide, the technical guide or the installation guide for OMRON CQM1H-CPU. You'll find the answers to all your questions on the OMRON CQM1H-CPU in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

User manual OMRON CQM1H-CPU
User guide OMRON CQM1H-CPU
Operating instructions OMRON CQM1H-CPU
Instructions for use OMRON CQM1H-CPU
Instruction manual OMRON CQM1H-CPU

Cat. No. W364-E1-05

SYSMAC CQM1H Series

CQM1H-CPU□□ Programmable Controllers
CQM1H-□□□□ Inner Boards

PROGRAMMING MANUAL

OMRON



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Manual abstract:

No. W364-E1-05 SYSMAC CQM1H Series CQM1H-CPU@@ Programmable Controllers CQM1H-@@@@ Programmable Controllers CQM1H-@@@@@ Always heed the information provided with them. @ Additionally, there may be severe property damage. Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. Additionally, there may be severe property damage. Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property damage. !Caution OMRON Product References All OMRON products are capitalized in this manual. The word "Unit" is also capitalized when it refers to an OMRON product, regardless of whether or not it appears in the proper name of the product. The abbreviation "Ch," which appears in some displays and on some OMRON products, often means "word" and is abbreviated "Wd" in documentation in this sense. The abbreviation "PC" means Programmable Controller and is not used as an abbreviation for anything else.

Visual Aids The following headings appear in the left column of the manual to help you locate different types of information. Note Indicates information of particular interest for efficient and convenient operation of the product. 1,2,3...

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Moreover, because OMRON is constantly striving to improve its high-quality products, the information contained in this manual is subject to change without notice. Every precaution has been taken in the preparation of this manual. Nevertheless, OMRON assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained in this publication. v vi TABLE OF CONTENTS PRECAUTIONS . . .

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The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products: · Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this manual. · Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations. · Systems, machines, and equipment that could present a risk to life or property. Please know and observe all prohibitions of use applicable to the products. NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM. PROGRAMMABLE PRODUCTS OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof. xiv Disclaimers CHANGE IN SPECIFICATIONS Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice.

When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products. DIMENSIONS AND WEIGHTS Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown. PERFORMANCE DATA Performance data given in this manual is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements.

Actual performance is subject to the OMRON Warranty and Limitations of Liability. ERRORS AND OMISSIONS The information in this manual has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.



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xv xvi **PRECAUTIONS** This section provides general precautions for using the CQMIH-series Programmable Controllers (PCs) and related devices. The information contained in this section is important for the safe and reliable application of Programmable Controllers. You must read this section and understand the information contained before attempting to set up or operate a PC system.

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of designing FA systems. · Personnel in charge of managing FA systems and facilities.

2 General Precautions The user must operate the product according to the performance specifications described in the operation manuals. Before using the product under conditions which are not described in the manual or applying the product to nuclear control systems, railroad systems, aviation systems, vehicles, combustion systems, medical equipment, amusement machines, safety equipment, and other systems, machines, and equipment that may have a serious influence on lives and property if used improperly, consult your OMRON representative. Make sure that the ratings and performance characteristics of the product are sufficient for the systems, machines, and equipment, and be sure to provide the systems, machines, and equipment with double safety mechanisms. This manual provides information for programming and operating the PC. Be sure to read this manual before attempting to use the PC and keep this manual close at hand for reference during operation.

!WARNING It is extremely important that a PC and all PC Units be used for the specified purpose and under the specified conditions, especially in applications that can directly or indirectly affect human life. You must consult with your OMRON representative before applying a PC System to the above-mentioned applications. 3 Safety Precautions !WARNING The CPU Unit refreshes I/O even when the program is stopped (i.e., even in PROGRAM mode).

Confirm safety thoroughly in advance before changing the status of any part of memory allocated to I/O Units, Dedicated I/O Units, or Inner Board. Any changes to the data allocated to any Unit may result in unexpected operation of the loads connected to the Unit. Any of the following operation may result in changes to memory status. · Transferring I/O memory data to the CPU Unit from a Programming Device. · Changing present values in memory from a Programming Device. · Force-setting/-resetting bits from a Programming Device. · Transferring I/O memory from a host computer or from another PC on a network. !WARNING Do not attempt to take any Unit apart or touch the interior while the power is being supplied. Doing so may result in electric shock. xviii Safety Precautions 3 !WARNING Do not touch any of the terminals or terminal blocks while the power is being supplied.

Doing so may result in electric shock. !WARNING Provide safety measures in external circuits (i.e., not in the Programmable Controller), including the following items, in order to ensure safety in the system if an abnormality occurs due to malfunction of the PC or another external factor affecting the PC operation. Not doing so may result in serious accidents. · Emergency stop circuits, interlock circuits, limit circuits, and similar safety measures must be provided in external control circuits. · The PC will turn OFF all outputs when its self-diagnosis function detects any error or when a severe failure alarm (FALS) instruction is executed. As a countermeasure for such errors, external safety measures must be provided to ensure safety in the system. · The PC outputs may remain ON or OFF due to deposition or burning of the output relays or destruction of the output transistors. As a countermeasure for such problems, external safety measures must be provided to ensure safety in the system.

· When the 24-VDC output (service power supply to the PC) is overloaded or short-circuited, the voltage may drop and result in the outputs being turned OFF. As a countermeasure for such problems, external safety measures must be provided to ensure safety in the system. !WARNING Do not attempt to disassemble, repair, or modify any Units. Any attempt to do so may result in malfunction, fire, or electric shock. !WARNING Do not touch the Power Supply Unit while power is being supplied or immediately after power has been turned OFF.

Doing so may result in burns. !Caution Execute online edit only after confirming that no adverse effects will be caused by extending the cycle time. Otherwise, the input signals may not be readable. !Caution Confirm safety at the destination node before transferring a program to another node or changing contents of the I/O memory area. Doing either of these without confirming safety may result in injury.

!Caution Tighten the screws on the terminal block of the AC Power Supply Unit to the torque specified in the operation manual. The loose screws may result in burning or malfunction. xix Operating Environment Precautions 4 4 Operating Environment Precautions !Caution Do not operate the control system in the following locations: · Locations subject to direct sunlight. · Locations subject to temperatures or humidity outside the range specified in the specifications. · Locations subject to condensation as the result of severe changes in temperature. · Locations subject to corrosive or flammable gases. · Locations subject to dust (especially iron dust) or salts. · Locations subject to exposure to water, oil, or chemicals. · Locations subject to shock or vibration. !Caution Take appropriate and sufficient countermeasures when installing systems in the following locations: · Locations subject to static electricity or other forms of noise.

· Locations subject to strong electromagnetic fields. · Locations subject to possible exposure to radioactivity. · Locations close to power supplies. !Caution The operating environment of the PC System can have a large effect on the longevity and reliability of the system.



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Improper operating environments can lead to malfunction, failure, and other unforeseeable problems with the PC System. Be sure that the operating environment is within the specified conditions at installation and remains within the specified conditions during the life of the system. 5 Application Precautions Observe the following precautions when using the PC System. !WARNING Always heed these precautions. Failure to observe the following precautions could lead to serious or possibly fatal injury. · Always ground the system to 100 or less when installing the Units.

Not connecting to a ground of 100 or less may result in electric shock. · Always turn OFF the power supply to the PC before attempting any of the following. Not turning OFF the power supply may result in malfunction or electric shock. · Mounting or dismounting Power Supply Units, I/O Units, CPU Units, any other Units, or Memory Cassettes · Assembling the Units. · Connecting cables or wiring the system.

· Connecting or disconnecting the connectors. · Setting DIP switches. · Replacing the battery. xx Application Precautions 5 !Caution Failure to observe the following precautions could lead to faulty operation of the PC or the system, or could damage the PC or PC Units. Always heed these precautions.

· Fail-safe measures must be taken by the customer to ensure safety in the event of incorrect, missing, or abnormal signals caused by broken signal lines, momentary power interruptions, or other causes. · Fail-safe measures must be taken by the customer to ensure safety in the event that outputs from Output Units remain ON as a result of internal circuit failures, which can occur in relays, transistors, and other elements. · Always turn ON power to the PC before turning ON power to the control system. If the PC power supply is turned ON after the control power supply, temporary errors may result in control system signals because the output terminals on DC Output Units and other Units will momentarily turn ON when power is turned ON to the PC. · Do not turn OFF the power supply to the PC when data is being transferred. In particular, do not turn OFF the power supply when reading or writing a Memory Card. Also, do not remove the Memory Card when the BUSY indicator is lit. To remove a Memory Card, first press the memory card power supply switch and then wait for the BUSY indicator to go out before removing the Memory Card. · If the I/O Hold Bit (SR 25212) is turned ON, the outputs from the PC will not be turned OFF and will maintain their previous status when the PC is switched from RUN or MONITOR mode to PROGRAM mode. Make sure that the external loads will not produce dangerous conditions when this occurs.

(When operation stops for a fatal error, including those produced with the FALS(07) instruction, all outputs from Output Unit will be turned OFF and only the internal output status will be maintained.) · Install the Units properly as specified in the operation manuals. Improper installation of the Units may result in malfunction. · Mount Units only after checking terminal blocks and connectors completely. · When assembling the Units or mounting the end cover, be sure to lock them securely as shown in the following illustrations. If they are not properly locked, desired functionality may not be achieved. · Be sure to mount the end cover to the rightmost Unit. · Be sure that all the mounting screws, terminal screws, and cable connector screws are tightened to the torque specified in the relevant manuals. Incorrect tightening torque may result in malfunction. · Be sure that the terminal blocks, Memory Units, expansion I/O cables, and other items with locking devices are properly locked into place.

Improper locking may result in malfunction. · Be sure to confirm the orientation and polarities when connecting terminal blocks and connectors. · Leave the label attached to the Unit when wiring. Removing the label may result in malfunction if foreign matter enters the Unit. · Remove the label after the completion of wiring to ensure proper heat dissipation.

Leaving the label attached may result in malfunction. · Wire all connections correctly. · When supplying power at 200 to 240 V AC from a CQM1-PA216 Power Supply Unit, always remove the metal jumper from the voltage selector xxi Application Precautions 5 terminals. The product will be destroyed if 200 to 240 V AC is supplied while the metal jumper is attached. · A ground of 100 or less must be installed when shorting the GR and LG terminals on the Power Supply Unit.

· Use crimp terminals for wiring. Do not connect bare stranded wires directly to terminals. Connection of bare stranded wires may result in burning. · Do not apply voltages to the Input Units in excess of the rated input voltage. Excess voltages may result in burning. · Do not apply voltages or connect loads to the Output Units in excess of the maximum switching capacity. Excess voltage or loads may result in burning. · Install external breakers and take other safety measures against short-circuiting in external wiring. Insufficient safety measures against short-circuiting may result in burning. · Always use the power supply voltages specified in the operation manuals.

An incorrect voltage may result in malfunction or burning. · Take appropriate measures to ensure that the specified power with the rated voltage and frequency is supplied. Be particularly careful in places where the power supply is unstable. An incorrect power supply may result in malfunction. · Disconnect the functional ground terminal when performing withstand voltage tests. Not disconnecting the functional ground terminal may result in burning. · Check switch settings, the contents of the DM Area, and other preparations before starting operation. Starting operation without the proper settings or data may result in an unexpected operation. · Check the user program for proper execution before actually running it on the Unit. Not checking the program may result in an unexpected operation.

· Double-check all wiring and switch settings before turning ON the power supply. Incorrect wiring may result in burning. · Confirm that no adverse effect will occur in the system before attempting any of the following. Not doing so may result in an unexpected operation. · Changing the operating mode of the PC.

· Force-setting/force-resetting any bit in memory. · Changing the present value of any word or any set value in memory. · Before touching a Unit, be sure to first touch a grounded metallic object in order to discharge any static build-up. Not doing so may result in malfunction or damage. · Do not pull on the cables or bend the cables beyond their natural limit.

Doing either of these may break the cables. · Do not place objects on top of the cables or other wiring lines.



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Doing so may break the cables. · Resume operation only after transferring to the new CPU Unit the contents of the DM Area, HR Area, and other data required for resuming operation. Not doing so may result in an unexpected operation. · Do not short the battery terminals or charge, disassemble, heat, or incinerate the battery. Do not subject the battery to strong shocks. Doing any of these may result in leakage, rupture, heat generation, or ignition of the battery. Dispose of any battery that has been dropped on the floor or oth- xxii Application Precautions 5 erwise subjected to excessive shock. Batteries that have been subjected to shock may leak if they are used.

· UL standards required that batteries be replaced only by experienced technicians. Do not allow unqualified persons to replace batteries. · When replacing parts, be sure to confirm that the rating of a new part is correct. Not doing so may result in malfunction or burning. · When transporting or storing circuit boards, cover them in antistatic material to protect them from static electricity and maintain the proper storage temperature. · Do not touch circuit boards or the components mounted to them with your bare hands. There are sharp leads and other parts on the boards that may cause injury if handled improperly. · Before touching a Unit or Board, be sure to first touch a grounded metallic object to discharge any static build-up from your body. Not doing so may result in malfunction or damage. · Provide sufficient clearances around the Unit and other devices to ensure proper heat dissipation.

Do not cover the ventilation openings of the Unit. · For wiring, use crimp terminals of the appropriate size as specified in relevant manuals. · Do not allow metallic objects or conductive wires to enter the Unit. · Set the operating settings of the Temperature Controller properly according to the system to be controlled. · Provide appropriate safety measures, such as overheat prevention and alarm systems, in separate circuits to ensure safety of the entire system even when the Temperature Controller malfunctions.

· Allow at least 10 minutes after turning ON the Temperature Controller as warmup time. · Do not use thinner to clean the product. Use commercially available cleaning alcohol. · Mount the I/O Control Unit on the right of the CPU Block. · When using Expansion I/O Blocks, configure the system so that the current consumptions for the CPU Block and each of the Expansion I/O Blocks do not exceed the specified values, and that the total current consumption does not exceed the current capacity of the Power Supply Unit.

· Configure the system so that the number of Units in both the CPU Block and Expansion I/O Blocks do not exceed the maximum number of connectable Units for the Block. xxiii Conformance to EC Directives 6 6 6-1 Conformance to EC Directives Applicable Directives · EMC Directives · Low Voltage Directive 6-2 Concepts EMC Directives OMRON devices that comply with EC Directives also conform to the related EMC standards so that they can be more easily built into other devices or machines. The actual products have been checked for conformity to EMC standards (see the following note). Whether the products conform to the standards in the system used by the customer, however, must be checked by the customer. EMC-related performance of the OMRON devices that comply with EC Directives will vary depending on the configuration, wiring, and other conditions of the equipment or control panel in which the OMRON devices are installed. The customer must, therefore, perform final checks to confirm that devices and the overall machine conform to EMC standards. Note Applicable EMC (Electromagnetic Compatibility) standards are as follows: EMS (Electromagnetic Susceptibility): EN61131-2 EMI (Electromagnetic Interference): EN61000-6-4 (Radiated emission: 10-m regulations) Low Voltage Directive Always ensure that devices operating at voltages of 50 to 1,000 V AC or 75 to 1,500 V DC meet the required safety standards for the PC (EN61131-2). 6-3 Conformance to EC Directives The CQM1H-series PCs comply with EC Directives. To ensure that the machine or device in which a CQM1H-series PC is used complies with EC directives, the PC must be installed as follows: 1,2,3..

· 1. The PC must be installed within a control panel. 2. Reinforced insulation or double insulation must be used for the DC power supplies used for the communications and I/O power supplies. 3. PCs complying with EC Directives also conform to the Common Emission Standard (EN61000-6-4). When a PC is built into a machine, however, noise can be generated by switching devices using relay outputs and cause the overall machine to fail to meet the Standards. If this occurs, surge killers must be connected or other measures taken external to the PC. The following methods represent typical methods for reducing noise, and may not be sufficient in all cases.

Required countermeasures will vary depending on the devices connected to the control panel, wiring, the configuration of the system, and other conditions.

6-4 Relay Output Noise Reduction Methods The CQM1H-series PCs conforms to the Common Emission Standards (EN61000-6-4) of the EMC Directives. However, noise generated by relay output switching may not satisfy these Standards. In such a case, a noise filter xxiv Conformance to EC Directives 6 must be connected to the load side or other appropriate countermeasures must be provided external to the PC. Countermeasures taken to satisfy the standards vary depending on the devices on the load side, wiring, configuration of machines, etc.

Following are examples of countermeasures for reducing the generated noise. Countermeasures Refer to EN61000-6-4 for more details. Countermeasures are not required if the frequency of load switching for the whole system including the PC is less than 5 times per minute. Countermeasures are required if the frequency of load switching for the whole system including the PC is 5 times or more per minute. Countermeasure Examples When switching an inductive load, connect a surge protector, diodes, etc.

, in parallel with the load or contact as shown below. Circuit Current AC DC Yes Yes Characteristic If the load is a relay or solenoid, there is a time lag between the moment the circuit is opened and the moment the load is reset. If the supply voltage is 24 or 48 V, insert the surge protector in parallel with the load. If the supply voltage is 100 to 200 V, insert the surge protector between the contacts. Required element The capacitance of the capacitor must be 1 to 0.5 μ F per contact current of 1 A and resistance of the resistor must be 0.5 to 1 per contact voltage of 1 V. These values, however, vary with the load and the characteristics of the relay. Decide these values from testing, and take into consideration that the capacitance suppresses spark discharge when the contacts are separated and the resistance limits the current that flows into the load when the circuit is closed again.



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..... 1-6-5 NT Link 1:1 Mode Communications

· DM 6645 to DM 6655: Read regularly when the power is ON. Changes in the PC Setup become effective only at the times given above. The CQM1H will thus have to be restarted to make changes in DM 6600 to DM 6614 effective, and program execution will have to be restarted to make changes in DM 6615 to DM 6644 effective. Making Changes from a Programming Device The PC Setup can be read, but not written, from the user program. Writing can be done only by using a Programming Console or other Programming Device.

DM 6600 to DM 6644 can be set or changed only while in PROGRAM mode. DM 6550 to DM 6559 and DM 6645 to DM 6655 can be set or changed while in either PROGRAM mode or MONITOR mode. Write-protecting the PC Setup After PC Setup settings have been made, pin 1 on the DIP switch on the front of the CPU Unit can be turned ON to prevent Programming Devices from overwriting the PC Setup. When pin 1 is ON, the user program, the read-only DM area (DM 6144 to DM 6568), and the PC Setup (DM 6600 to DM 6655) cannot be overwritten from a Programming Device. 2 PC Setup Errors in the PC Setup Section 1-1 If an incorrect PC Setup setting is accessed, a non-fatal error (error code 9B) will be generated, the corresponding error flag will be turned ON, and the default setting will be used.

Flag(s) AR 2400 AR 2401 AR 2402 AR 0400 to AR 0407 Function Turns ON when there is an error in DM 6600 to DM 6614 (read when the power is turned ON). Turns ON when there is an error in DM 6615 to DM 6644 (read at the beginning of operation). Turns ON when there is an error in DM 6645 to DM 6655 (read regularly when power is ON). An error code of 10 is written to this byte when there is an error in DM 6550 to DM 6559 (read regularly when power is ON).

1-1-2 Serial Communications Board Settings The following table shows the Serial Communications Board settings in the DM area. For details, refer to the Serial Communications Board Operation Manual. Word(s) Bit(s) Function Serial Communications Board Settings The following settings are effective after transfer to the PC. (The settings for port 2 are contained in words DM 6550 to DM 6554 and the settings for port 1 are contained in words DM 6555 to DM 6559.) DM 6550 (port 2) DM 6555 (port 1) 00 to 03 Port Settings 0: Standard (1 start bit, 7-bit data, even parity, 2 stop bits, 9,600 bps) 1: Settings in DM 6551 (DM 6556 for port 1) CTS Control Settings 0: Disable; 1: Set Link Words for 1:1 Data Link (when bits 12 to 15 are set to 3) 0: LR 00 to LR 63; 1: LR 00 to LR 31; 2: LR 00 to LR 15 Maximum Programmable Terminal unit number (when bits 12 to 15 are set to 5) 1 to 7 Communications Mode 0: Host Link; 1: No-protocol; 2: 1:1 Data Link Slave; 3: 1:1 Data Link Master; 4: NT Link in 1:1 Mode; 5: NT Link in 1:N Mode; 6: Protocol Macro Baud Rate 00: 1.2K, 01: 2.4K, 02: 4.8K, 03: 9.6K, 04: 19.2K Frame Format Start Length Stop Parity 00: 1bit 7 bits 1 bit Even 01: 1bit 7 bits 1 bit Odd 02: 1bit 7 bits 1 bit None 03: 1bit 7 bits 2 bit Even 04: 1bit 7 bits 2 bit Odd 05: 1bit 7 bits 2 bit None 06: 1 bit 8 bits 1 bit Even 07: 1 bit 8 bits 1 bit Odd 08: 1 bit 8 bits 1 bit None 09: 1 bit 8 bits 2 bit Even 10: 1 bit 8 bits 2 bit Odd 11: 1 bit 8 bits 2 bit None Transmission Delay (Host Link or No-protocol) 0000 to 9999 (BCD): Set in units of 10 ms, e.g., a setting of 0001 equals 10 ms 04 to 07 08 to 11 12 to 15 DM 6551 (port 2) DM 6556 (port 1) 00 to 07 08 to 15 DM 6552 (port 2) DM 6557 (port 1) 00 to 15 3 PC Setup Word(s) DM 6553 (port 2) DM 6558 (port 1) Bit(s) 00 to 07 08 to 11 12 to 15 Function Node Number (Host Link) 00 to 31 (BCD) Start Code Enable (No-protocol) 0: Disable; 1: Set End Code Enable (No-protocol) 0: Disable (number of bytes received) 1: Set (specified end code) 2: CR, LF Start Code (No-protocol) 00 to FF (hexadecimal) When bits 12 to 15 of DM 6553 or DM 6558 are set to 0: Number of Bytes Received 00: Default setting (256 bytes) 01 to FF: 1 to 255 bytes When bits 12 to 15 of DM 6553 or DM 6558 are set to 1: End Code (No-protocol) 00 to FF (hexadecimal) Section 1-1 DM 6554 (port 2) DM 6559 (port 1) 00 to 07 08 to 15 1-1-3 PC Setup Settings The following table shows the PC Setup settings in order in the DM area. For details, refer to the page numbers shown. Word(s) Bit(s) Function Page Startup Processing (DM 6600 to DM 6614) The following settings are effective after transfer to the PC only after the PC is restarted. DM 6600 00 to 07 Startup Mode (effective when bits 08 to 15 are set to 02). 00: PROGRAM; 01: MONITOR 02: RUN 08 to 15 Startup Mode Designation 00: Depends on CPU Unit DIP switch pin 7 and Programming Console switch settings 01: Continue operating mode last used before power was turned OFF 02: Setting in DM 6600 bits 00 to 07 DM 6601 00 to 07 08 to 11 12 to 15 DM 6602 to DM 6603 DM 6604 to DM 6610 DM 6611 to DM 6612 DM 6613 00 to 15 00 to 15 00 to 15 00 to 15 Not used.

I/O Hold Bit Status (SR 25212) 0: Reset; 1: Maintain Forced Status Hold Bit Status (SR 25211) 0: Reset; 1: Maintain Inner Board Slot 1 Settings (See 1-2 Inner Board Settings for details.) Not used. Inner Board Slot 2 Settings (See 1-2 Inner Board Settings for details.) Servicing Time Setting for Serial Communications Board Port 2 12 13 9 9 9 DM 6614 00 to 15 Servicing Time Setting For Serial Communications Board Port 1 Pulse Output and Cycle Time Settings (DM 6615 to DM 6619) The following settings are effective after transfer to the PC the next time operation is started. DM 6615 00 to 07 Word for Pulse Output 46 00: IR 100; 01: IR101; 02: IR 102.

.. 15: IR 115 Sets the word used for pulse output from an output on a Transistor Output Unit. Pulses can be output only from one output at a time. 08 to 15 Not used.

Set to 00. 4 PC Setup Word(s) DM 6616 Bit(s) 00 to 07 Section 1-1 Function Page Servicing Time for RS-232C Port (when bits 08 to 15 are set to 01) 13 00 to 99 (BCD): Percentage of cycle time used to service RS-232C port. The servicing time must be between 0.256 ms and 65.536 ms. RS-232C Port Servicing Setting Enable 00: 5% of the cycle time 01: Use time in 00 to 07. (When the PC is stopped, the servicing time will always be 10 ms.) Servicing Time for Peripheral Port (when bits 08 to 15 are set to 01) 14 00 to 99 (BCD): Percentage of cycle time used to service peripheral port. The servicing time must be between 0.256 ms and 65.536 ms. 08 to 15 DM 6617 00 to 07 Peripheral Port Servicing Setting Enable 00: 5% of the cycle time 01: Use time setting in bits 00 to 07. (When the PC is stopped, the servicing time will always be 10 ms.) DM 6618 00 to 07 Cycle Monitor Time (when bits 08 to 15 are set to 01, 02, or 03) 00 to 99 (BCD) × setting units (See bits 08 to 15.) 08 to 15 Cycle Monitor Enable 00: 120 ms (setting in bits 00 to 07 disabled) 01: Setting units: 10 ms 02: Setting units: 100 ms 03: Setting units: 1 s DM 6619 00 to 15 Cycle Time 0000: Variable (no minimum) 0001 to 9999 (BCD): Minimum cycle time in ms Interrupt Processing (DM 6620 to DM 6639) The following settings are effective after transfer to the PC the next time operation is started.



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) When connecting a personal computer to the peripheral port for use as a Programming Device, turn pin 7 ON and set the communications mode to "Host Link." When these settings have been made and the personal computer is set for peripheral bus operation, the CPU Unit's peripheral port communications mode will automatically switch to peripheral bus mode.

Baud Rate (Host Link, peripheral bus, or No-protocol mode) 00: 1.2 kbps, 01: 2.4 kbps, 02: 4.8 kbps, 03: 9.6 kbps, 04: 19.

2 kbps Frame Format (Host Link or No-protocol mode) Start Length Stop Parity 00: 1 bit 7 bits 1 bit Even 01: 1 bit 7 bits 1 bit Odd 02: 1 bit 7 bits 2 bit Even 03: 1 bit 7 bits 2 bit Odd 04: 1 bit 7 bits 2 bit None 05: 1 bit 7 bits 2 bit None 06: 1 bit 8 bits 1 bit Even 07: 1 bit 8 bits 1 bit Odd 08: 1 bit 8 bits 1 bit None 09: 1 bit 8 bits 2 bit Even 10: 1 bit 8 bits 2 bit Odd 11: 1 bit 8 bits 2 bit None Transmission Delay (No-protocol or Slave-initiated Host Link communications only) 0000 to 9999 (BCD): Set in units of 10 ms, e.g., a setting of 0001 equals 10 ms Node Number (Host Link): 00 to 31 (BCD) Start Code Enable (No-protocol) 0: Disable; 1: Set End Code Enable (No-protocol) 0: Disable (number of bytes received) 1: Set (specified end code) 2: CR, LF Start Code (No-protocol) 00 to FF (hexadecimal) When bits 12 to 15 of DM 6653 are set to 0: Number of Bytes Received 00: Default setting (256 bytes) 01 to FF: 1 to 255 bytes When bits 12 to 15 of DM 6653 are set to 1: End Code (No-protocol) 00 to FF (hexadecimal) 16, 47 DM 6651 00 to 07 08 to 15 47 DM 6652 DM 6653 00 to 15 00 to 07 08 to 11 12 to 15 DM 6654 00 to 07 08 to 15 47 8 Inner Board Settings Word(s) Bit(s) Error Log Settings (DM 6655) The following settings are effective after transfer to the PC. DM 6655 00 to 03 Function Section 1-2 Page 04 to 07 08 to 11 Style 0: Shift after 10 records have been stored 1: Store only first 10 records (no shifting) 2 to F: Do not store records Not used. Set to 0.

Cycle Time Monitor Enable 0: Detect long cycles as non-fatal errors 1: Do not detect long cycles Low Battery Error Enable 0: Detect low battery voltage as non-fatal error 1: Do not detect low battery voltage 17 12 to 15 1-2 Inner Board Settings This section explains the PC Setup settings related to Inner Boards mounted in Inner Board slots 1 and 2. 1-2-1 Settings for a Serial Communications Board Use the settings in DM 6613 and DM 6614 to set the servicing times for a Serial Communications Board mounted in Inner Board slot 1. (A Serial Communications Board cannot be mounted in slot 2.) Word DM 6613 Bits 00 to 07 Function Servicing Time for Serial Communications Board Port 2 (enabled by bits 08 to 15) 00 to 99 (BCD): Sets the percentage of the cycle time used to service port 2. The servicing time must be between 0.256 ms and 65.536 ms. Serial Communications Board Port 2 Servicing Setting 00: Fixed at 5% of the cycle time. 01: Use time setting in bits 00 to 07. (When the PC is stopped, the servicing time will always be 10 ms.

) Servicing Time for Serial Communications Board Port 1 (enabled by bits 08 to 15) 00 to 99 (BCD): Sets the percentage of the cycle time used to service port 1. The servicing time must be between 0.256 ms and 65.536 ms. Serial Communications Board Port 1 Servicing Setting 00: Fixed at 5% of the cycle time. 01: Use time setting in bits 00 to 07. (When the PC is stopped, the servicing time will always be 10 ms.) 08 to 15 DM 6614 00 to 07 08 to 15 9 Inner Board Settings Section 1-2 1-2-2 Settings for a High-speed Counter Board The settings in DM 6602, DM 6640, and DM 6641 determine the operation of a High-speed Counter Board mounted in Inner Board slot 1. The settings in DM 6611, DM 6643, and DM 6644 determine the operation of a High-speed Counter Board mounted in Inner Board slot 2. Word Bits Function DM 6602 00 High-speed Counter PV Data Format (Slot 1) DM 6611 (Slot 2) 01 to 07 Not used 08 External Output Transistor Selector 09 to 15 Not used.

DM 6640 00 to 03 High-speed Counter 1 Input Mode (Slot 1) 04 to 07 High-speed Counter 1 Count Frequency, Numeric Range, and (Slot 2) Counter Reset Mode 08 to 11 High-speed Counter 2 Input Mode 12 to 15 High-speed Counter 2 Count Frequency, Numeric Range, and Counter Reset Mode DM 6641 00 to 03 (Slot 1) 04 to 07 DM 6644 (Slot 2) High-speed Counter 3 Input Mode High-speed Counter 3 Count Frequency, Numeric Range, and Counter Reset Mode Settings OFF: 8-digit hexadecimal ON: 8-digit BCD Set to 0. OFF: Sourcing ON: Sinking Set to 0. See note 1. See note 2. See note 1. See note 2. 08 to 11 High-speed Counter 4 Input Mode 12 to 15 High-speed Counter 4 Count Frequency, Numeric Range, and Counter Reset Mode See note 1. See note 2.

Note 1. The settings for the high-speed counter input mode are as follows: Setting 0 Hex 1 Hex 2 Hex 3 Hex 4 Hex Input Mode Differential Phase Inputs, 1x Differential Phase Inputs, 2x Differential Phase Inputs, 4x Up/Down Input Pulse/Direction Input 2. The settings for the high-speed counter count frequency, numeric range, and counter reset mode are as follows: Setting 0 Hex 1 Hex 2 Hex 3 Hex 4 Hex 5 Hex 6 Hex 7 Hex 500 kHz Count frequency 50 kHz Numeric range Linear Counting Ring Counting Linear Counting Ring Counting Reset mode Phase-Z + Software Reset Software Reset Only Phase-Z + Software Reset Software Reset Only Phase-Z + Software Reset Software Reset Only Phase-Z + Software Reset Software Reset Only 10 Inner Board Settings Section 1-2 1-2-3 Settings for a Pulse I/O Board The settings in DM 6611, DM 6643, and DM 6644 determine the operation of a Pulse I/O Board mounted in Inner Board slot 2. (A Pulse I/O Board cannot be mounted in slot 1.) Word DM 6611 Bits 00 to 15 Function Mode Setting for Ports 1 and 2 0000: High-speed Counter Mode 0001: Simple Positioning Mode Port 1 Input Mode 0: Differential Phase Mode 1: Pulse/Direction Mode 2: Up/Down Mode Port 1 Counter Reset Method 0: Phase-Z and software reset; 1: Software reset only Port 1 Numeric Range 0: Linear counting; 1: Ring counting Port 1 Pulse Output Duty Factor 0: Fixed duty factor; 1: Variable duty factor Port 2 Input Mode 0: Differential Phase Mode 1: Pulse/Direction Mode 2: Up/Down Mode Port 2 Counter Reset Method 0: Phase-Z and software reset; 1: Software reset only Port 2 Numeric Range 0: Linear counting; 1: Ring counting Port 2 Pulse Output Duty Factor 0: Fixed duty factor; 1: Variable duty factor DM 6643 00 to 03 04 to 07 08 to 11 12 to 15 DM 6644 00 to 03 04 to 07 08 to 11 12 to 15 1-2-4 Settings for an Absolute Encoder Interface Board The settings in DM 6611, DM 6612, DM 6643, and DM 6644 determine the operation of an Absolute Encoder Interface Board mounted in Inner Board slot 2. (An Absolute Encoder Interface Board cannot be mounted in slot 1.) Word DM 6611 Bits 00 to 15 Function Origin Compensation for Port 1 (4-digit BCD) Origin will be compensated when the Port 1 Origin Compensation Bit (SR 25201) is turned ON.



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