GE Industrial Control Systems

MULTI-BRIDGE HUB COMMUNICATIONS BOARD

DS200MBHAG1A_ _, DS200MBHAG2A_ _, and DS200MBHAG3A_ _

These instructions do not purport to cover all details or variations in equipment, nor to provide every possible contingency to be met during installation, operation, and maintenance. If further information is desired or if particular problems arise that are not covered sufficiently for the purchaser's purpose, the matter should be referred to GE Industrial Control Systems.

CONTENTS

SAFETY SYMBOL LEGEND

WARNING — Indicates a procedure, practice, condition, or statement that, if not strictly observed, could result in personal injury or death.

CAUTION — Indicates a procedure, practice, condition, or statement that, if not strictly observed, could result in damage to or destruction of equipment

NOTE Indicates an essential or important procedure, practice, condition, or statement.

FUNCTIONAL DESCRIPTION

WARNING

This equipment contains a potential hazard of electric shock or burn. Only adequately trained persons who are thoroughly familiar with the equipment and the instructions should install or maintain this equipment.

INTRODUCTION

The DS200MBHA Multi-bridge Hub Communications Board (MBHA) is the fiber-optic communications link between the member drives of a multi-bridge system and between adjacent drive systems. The MBHA board includes an internal +5 V dc power supply, seven fiber-optic data links consisting of receiver/ transmitter pairs, optically coupled logic inputs for control of local/broadcast modes, and a programmable logic device to provide system logic.

POWER SUPPLY

The MBHA board contains a 100 kHz, +5 V dc switching power supply that provides internal power for the MBHA board only. The power supply is typically powered from an unregulated 24 V dc source, and can operate with an input voltage of between 15 and 30 V dc. Power consumption is approximately 5 W.

The power supply includes redundant inputs wired in a diode OR configuration so that only the higher of the two input voltages is used by the power supply. If one of the two inputs is lost, the power supply can continue to operate.

FIBER-OPTIC TRANSMITTER/RECEIVER PAIRS

The MBHA board includes seven 1 Mbaud fiber-optic data links, located along one edge of the board. The data links are grouped in transmitter (gray) and receiver (blue) pairs so that they can be accessed via duplex fiber-optic cables. The CONTROL 1 through CONTROL 5 data links are used to communicate with the DS200SPCB Multi-bridge Signal Processing Card (SPCB) in each of the follower drives in a system consisting of up to six drives. The BROADCAST LEFT and BROADCAST RIGHT data links are used to communicate with the MBHA boards in the master drives of adjacent systems.

MODE CONTROL

The MBHA board also includes three fiber-optic receivers (designated C1MODE, C2MODE, and C3MODE) used to receive mode control information (local/broadcast) from individual drives. The C1MODE and C2MODE receivers are 1 Mbaud data links; the C3MODE link includes circuits to reduce its bandwidth to 100 kbaud.

SYSTEM LOGIC

The MBHA board includes a programmable logic device that provides system logic.

BOARD GROUPS

There are three groups of the MBHA board, G1, G2, and G3. G1 boards have a different programmable logic device than G2/G3 boards. Jumper JP1 also has different functions on certain revision G1 MBHA boards than on G2/G3 boards. See Table 1 for jumper description.

APPLICATION DATA

BOARD HARDWARE

The CDBA board includes a configurable jumper, 22 testpoints, 17 fiber optic connectors, and wiring connectors (two terminal boards and a stab connector) as part of the board. These items are described in the following paragraphs of this section.

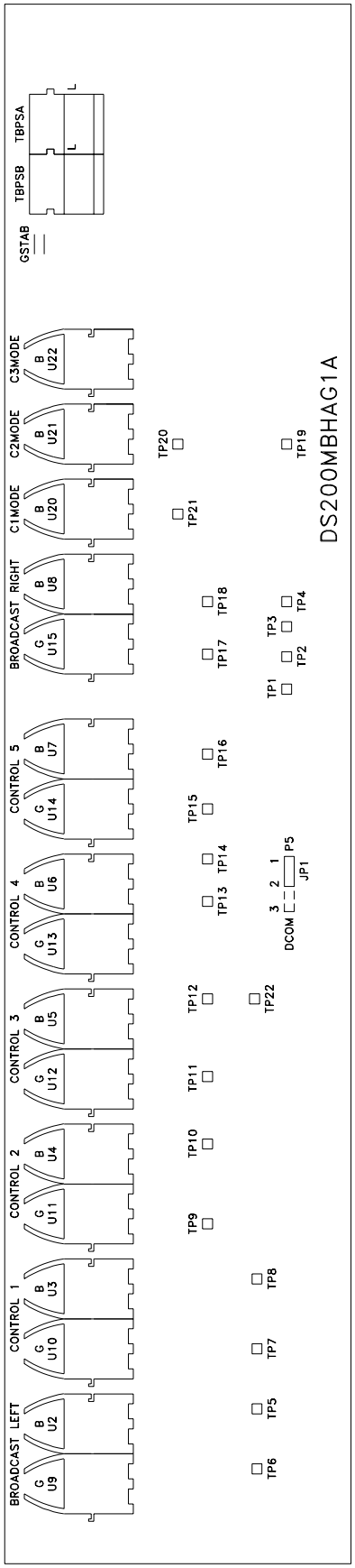

Figure 1. MBHA Board Layout

CONFIGURABLE JUMPER (JP1)

All MBHA boards include one configurable jumper for factory test selection or communication logic selection, depending on board group and revision. Refer to Figure 1 for the location of the jumper (JP1) and to Table 1 for the setting of the jumper per board group and revision.

TESTPOINTS

There are 22 testpoints present on the MBHA board to allow checking of transmitted/received signal status, MBHA board common (that is different from drive common), and the board's power supply. See Figure 1 for the locations of the testpoints and Table 2 for the descriptions.

FIBER-OPTIC CONNECTORS

The MBHA board includes seven fiber-optic receiver/transmitter circuit pairs and three optically coupled receiver circuits. See Figure 1 for the location of the fiber-optic connectors and Table 3 for descriptions.

BOARD CONNECTORS

The MBHA board receives power supply inputs via two terminal board connectors, TBPSA and TBPSB. The MBHA board also provides one stab connector, GSTAB. See Figure 1 for an MBHA board layout diagram showing the locations of these connectors and see Table 4 for the signal descriptions of the terminal board connectors.

Table 1. MBHA Board Jumper (JP1) Settings

Revision	Group	Name	Description
AAA – AGD	G1	JP1	Factory test jumper (programmable logic device input) JP1 position 2.3 is for factory board test purposes only. If not in factory board test; JP1 must be 1.2. 1.2 Normal operation 2.3 Special setting for factory board test
AHD – Present	G1	JP1	Communication logic selection jumper 1.2 DC2000 K frame communication logic 2.3 CV2000 communication logic
AAA – Present	G2/G3	JP1	Factory test jumper (programmable logic device input) JP1 position 2.3 is for factory board test purposes only. If not in factory board test; JP1 must be 1.2. 1.2 Normal operation 2.3 Special setting for factory board test

Table 2. MBHA Board Testpoints

Name	Description
TP1	C1MODE testpoint.
TP2	C2MODE testpoint.
TP3	C3MODE testpoint.
TP4	Oscillator for programmable logic device.
TP5	Received broadcast left fiber-optic signal.
TP6	Transmitted broadcast left fiber-optic signal.
TP7	Transmitted signal to bridge #1 (primary master).
TP8	Received signal from bridge #1 (primary master).
TP9	Transmitted signal to bridge #2 (alternate master).
TP10	Received signal from bridge #2 (alternate master).

Table 2. MBHA Board Testpoints — Continued

Name	Description
TP11	Transmitted signal to bridge #3.
TP12	Received signal from bridge #3.
TP13	Transmitted signal to bridge #4.
TP14	Received signal from bridge #4.
TP15	Transmitted signal to bridge #5.
TP16	Received signal from bridge #5.
TP17	Transmitted signal to broadcast right output.
TP18	Received signal from broadcast right input.
TP19	+20 V input voltage, nominally +24 V.
TP20	+5 V dc power supply for MBHA board (not at same potential as drive).
TP21	Common level for MBHA board (not at same potential as drive DCOM).
TP22	Common level for MBHA board (not at same potential as drive DCOM).

Table 3. MBHA Fiber-optic Connectors

Connector (Color)	Nomenclature	Description
U9 (Gray), U2 (Blue)	BROADCAST LEFT	Fiber-optic Broadcast Left Communications. 12-pulse or larger bridges use this fiber-optic channel to communicate between masters of each 6-pulse lineup. This fiber-optic connection goes to the MBHA hub communication board of the adjacent 6-pulse lineup master.
U10 (Gray), U3 (Blue)	CONTROL 1	Fiber-optic Bridge #1 Communications. This fiber-optic channel should connect to bridge #1's SPCB board COMM IN/COMM OUT channel. Bridge-to-bridge communications occur through this channel.
U11 (Gray), U4 (Blue)	CONTROL 2	Fiber-optic Bridge #2 Communications. This fiber-optic channel should connect to bridge #2's SPCB board COMM IN/COMM OUT channel. Bridge-to-bridge communications occur through this channel.
U12 (Gray), U5 (Blue)	CONTROL 3	Fiber-optic Bridge #3 Communications. This fiber-optic channel should connect to bridge #3's SPCB board COMM IN/COMM OUT channel. Bridge-to-bridge communications occur through this channel.
U13 (Gray), U6 (Blue)	CONTROL 4	Fiber-optic Bridge #4 Communications. This fiber-optic channel should connect to bridge #4's SPCB board COMM IN/COMM OUT channel. Bridge-to-bridge communications occur through this channel.
U14 (Gray), U7 (Blue)	CONTROL 5	Fiber-optic Bridge #5 Communications. This fiber-optic channel should connect to bridge #5's SPCB board COMM IN/COMM OUT channel. Bridge-to-bridge communications occur through this channel.
U15 (Gray), U8 (Blue)	BROADCAST RIGHT	Fiber-optic Broadcast Right Communications. 12-pulse or larger bridges use this fiber-optic channel to communicate between masters of each 6-pulse lineup. This fiber-optic connection goes to the MBHA hub communication board of the adjacent 6-pulse lineup master.

Table 3. MBHA Fiber-optic Connectors — Continued

Connector (Color)	Nomenclature	Description
U20 (Blue)	C1MODE	Fiber-optic Bridge #1 Mode Communications Input. This fiber-optic channel should connect to bridge #1's SPCB board MODE channel. MBHA board logic selections occur through this channel.
U21 (Blue)	C2MODE	Fiber-optic Bridge #2 Mode Communications Input. This fiber-optic channel should connect to bridge #2's SPCB board MODE channel. MBHA board logic selections occur through this channel.
U22 (Blue)	C3MODE	Fiber-optic Bridge #3 Mode Communications Input. This fiber-optic channel should connect to bridge #3's SPCB board MODE channel. MBHA board logic selections occur through this channel.

Table 4. Connectors TBPSA and TBPSB, Power Supply Inputs to MBHA Board

Connector	Pin No.	Nomenclature	Description
TBPSA	1	P20P	Primary positive power supply input to the MBHA board. P20P, GNDP, P20A, and GNDA are the primary and alternate power supply inputs for the MBHA board, normally supplied from the P24 and COM signals of two drives in the multi-bridge arrangement. GNDP and GNDA are assumed to be nominally at the same potential. The alternate inputs provide redundancy in case the master drive is shut down. Assuming P20P is 24 V dc, the MBHA board consumes approximately 200 mA of current.
TBPSA	2	GNDP	Primary common power supply input to the MBHA board.
TBPSB	1	P20A	Alternate positive power supply input to the MBHA board (see TBPSA-1).
TBPSB	2	GNDA	Alternate common power supply input to the MBHA board.

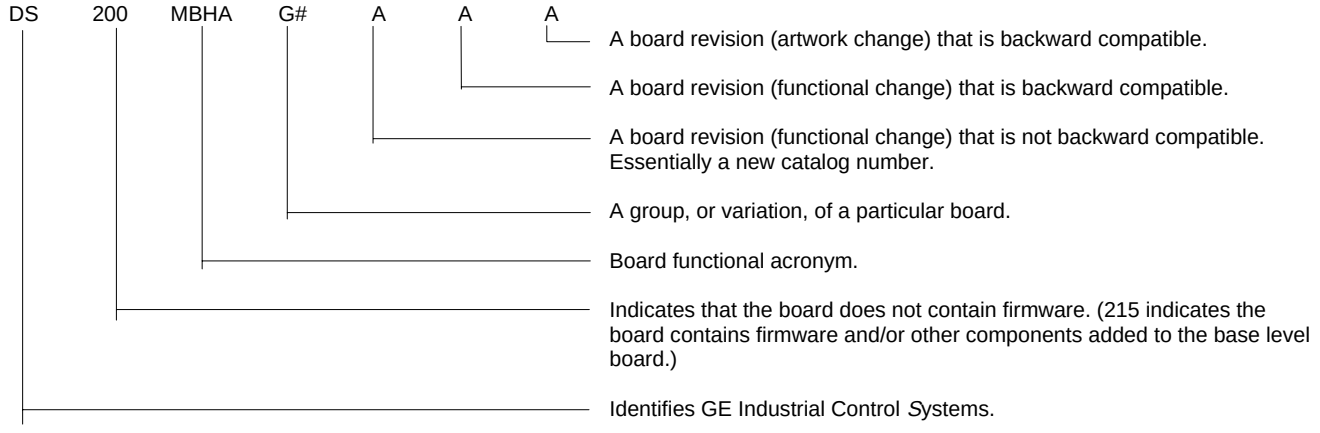

Figure 2. Sample Board Part Number, DS Series

RENEWAL/WARRANTY REPLACEMENT

BOARD IDENTIFICATION

A printed wiring board is identified by an alphanumeric part (catalog) number stamped on its edge. For example, the Multi-Bridge Hub Communications Board is identified by part number DS200MBHAG#ruu. (See Figure 2 for part number breakdown.)

NOTE

All digits are important when ordering or replacing any board.

WARRANTY TERMS

The GE Industrial Control Systems Terms and Conditions brochure details product warranty information, including the **warranty period** and **parts and service** coverage.

The brochure is included with customer documentation. It may be obtained separately from the nearest GE Sales Office or authorized GE Sales Representative.

WARRANTY PARTS AND SERVICE

There are no end-user replaceable components on the MBHA board. If any other components on the board fail, the board needs to be replaced as a unit.

To obtain a replacement board, or service assistance, contact the nearest GE Service Office.

Please have the following information ready to exactly identify the **part** and **application**:

- GE requisition or shop order number
- Equipment serial number and model number
- Board number and description

PROCEDURE FOR REPLACING BOARDS

CAUTION

To prevent equipment damage, do not remove boards or connections, or re-insert them, while power is applied to the drive.

Treat all boards as static-sensitive. Use a grounding strap when changing boards or software chips, and always store boards in anti-static bags or boxes they were shipped in.

To replace an MBHA board:

1. **Turn off all power to the drive**, then wait several minutes for all the power supply's capacitors to discharge. Test any electrical circuits before touching them to ensure the power is off.

2. Open the drive's cabinet door to access the printed wiring boards and locate the MBHA board (typically near the top of the enclosure).

NOTE

Connectors TBPSA and TBPSB are two-section connectors. One section of the connector is mounted on the MBHA board and the other section, that contains the screw terminals, plugs into the board-mounted section. Do not disconnect the individual wires from the screw terminal section. Instead, after noting the location of each connector, use a screwdriver to carefully pry the two sections apart.

3. Carefully disconnect all cables from the MBHA board as follows:
   - Verify cables are labeled with the correct connector name (as marked on the board) to simplify reconnection.
   - For fiber-optic connectors, depress the latch on the mating cable connector, then pull the connector loose. Pull on the connector only; do not pull on the cable.
   - Pry the two sections of the TBPSA and TBPSB connectors apart using a screwdriver.

NOTE

The MBHA board is typically mounted in a plastic board frame. The lower edge of the board is gripped by tabs located along the lower edge of the frame and the board is secured by two screws located in the upper corners of the board.

4. Remove the two screws that secure the MBHA board in the frame and remove the board.

NOTE

Because of upgrades, boards of different revision levels may not contain identical hardware. However, GE Industrial Control Systems assures compatibility of its replacement boards.

5. Verify that jumper JP1 on the new (replacement) MBHA board is set in the exact same position as on the old board.
   - If a board revision has changed the jumper setting, refer to Table 1.
6. Pry apart the TBPSA and TBPSB connectors on the new MBHA board and set the screw terminal sections aside.
7. Orient the new MBHA board in the same position as the one removed, place the lower edge of the board into the tabs along the lower edge of the board frame, and secure it to the frame with the two screws removed in step 4, then fully tighten the two screws.
8. Reconnect both of the terminal board sections (that were disconnected in step 3) from the old MBHA board (with wires still connected) to the respective connector section on the new board. Ensure that each connector section is in the correct location and that it is properly seated.
9. Reconnect all fiber-optic cables to the MBHA board as labeled that were disconnected in step 3. Ensure that cables are properly seated at both ends, then close the drive cabinet door.

Notes:

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