GE Motors & Industrial Systems

ANALOG TO DIGITAL MODULE DAUGHTERBOARD

DS200ADMAG_A_ _

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 Motors & Industrial 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

INTRODUCTION

The DS200ADMA daughterboard (ADMA) is an auxiliary I/O daughterboard that mounts on the DS200DSPC board (DSPC). The ADMA board connects to an external high voltage terminal board DS200DDTB (DDTB) by means of high density connectors and cables. The ADMA-DDTB board set provides an interface to analog inputs and outputs including buffering, filtering, and conversion in both directions for the DSPC board. The board set also provides a selection of discrete digital I/O input and output signals with buffering and conditioning.

The ADMA board plugs into one pair of the four pairs of XA_ and XB_ interface connectors on the DSPC board (as defined by the individual project). It is additionally secured in place by three standoffs with screws supplied with the DSPC board.

GENERAL FEATURES

Electronic Board Identification

An add-only electronic ID memory is provided on the ADMA board that contains board identification and hardware revision information. This memory is accessed through a 1-wire LAN and allows the host DSPC board to electronically identify the daughterboards that are present. This information is read and reported during power-up. The DSPC board hosts the ID interface for reading, but it cannot alter the ID information.

Configurability

The ADMA board uses a static RAM-based erasable programmable logic device (EPLD) to implement the interface logic to the host DSPC board. The EPLD is configured by the DSPC board during system power up or reset.

Analog I/O

A mix of analog input and output channels are provided by the ADMA board as described below.

There are three analog inputs that are converted to frequency with a scaling of 200K Hz/V + 1M Hz carrier over a range of ±5 V. These analog signals are each filtered through a low pass filter and the frequency outputs are available to the EPLD for counting, accumulation, and access by the DSPC board's DSP.

There are nine sampled ±5 V analog inputs that are converted by 12-bit successive approximation A/D converters and made available to the DSPC board's DSP via the EPLD logic. The logic provides conversion control and double buffering.

There are also four analog outputs scaled to drive a 2K ohm, 500 picofarad load to ±10 V with 12-bit resolution.

Discrete Digital I/O

Eight digital inputs and outputs are also provided by the ADMA board as described below.

Digital input signals that are received from the external terminal board are filtered with a 100 microsecond time constant passive network and received through inverting Schmit buffers. These signals are registered and interfaced to the DSPC board's DSP through the EPLD to allow application specific adaptation of the interface.

Digital output signals are registered in the EPLD interface to the DSPC board's DSP and buffered to the external terminal board through inverters. Field programmable logic device (FPLD) logic may be used to establish applications specific addressing.

Programmable Logic

A static RAM based programmable logic device provides the interface between the DSPC board's processor buses and the I/O features of the ADMA daughterboard. During initialization, the DSP downloads the logic definition for the specific application requirements.

Initial configuration of the logic provides a double buffered (no wait state) interface to the A/D convert pool as global memory and provides a global sync pulse to latch/start the A/D conversion process. The logic for accumulating and latching VCO counts and transferring the data to the DSP as simple memory reads also reside in this logic element. The interface to discrete logic I/O lines provides mapping so that these lines can be addressed as a 16-bit word. Logic configuration is via a memory mapped interface driven by the DSPC board's DSP.

ADMA Board Faceplate (See Figure 1)

The ADMA daughterboard is equipped with a metal faceplate that mates with a cutout in the DSPC board's front faceplate (position 1, 2, 3, or 4; see Figure 2). The green IMOK and red FAIL LEDs are visible on the faceplate of the board. The TBPL connector is also located on the board faceplate.

APPLICATION DATA

LEDS

There are two LEDs located on the ADMA board faceplate (see Figure 1 for location). These LEDs indicate ADMA board status. The green IMOK LED indicates that the board is functioning properly, while the red FAIL LED is driven by software on the DSPC board and indicates that something on the ADMA board has failed.

CONNECTORS

The connectors that are located on the ADMA board are shown in Table 1 (with a brief description of signals). See Figure 1 for location of the TBPL connector. The individual pin signals for the TBPL connector are shown in Table 2. Connectors XA_ and XB_ are for connecting/mounting the ADMA daughterboard to the host DSPC board (these are located on the opposite side of the ADMA board).

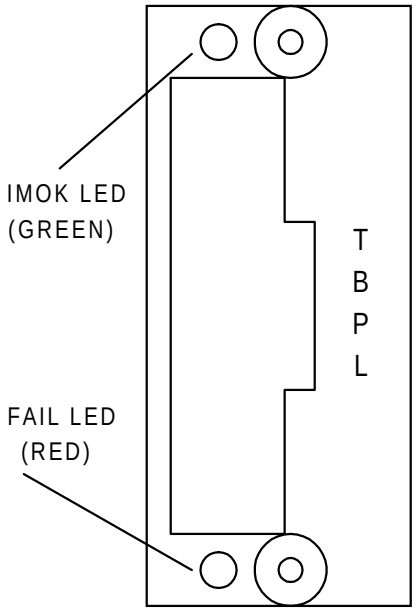

Figure 1. ADMA Board Faceplate

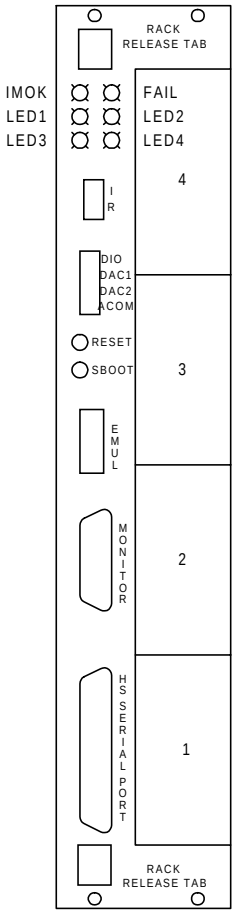

Figure 2. DSPC Board Faceplate

Table 1. ADMA Board Connectors

Connector	Description	Type
TBPL	Interface to DDTB board that includes the following pin signals: 8 discrete logic outputs, 8 discrete logic inputs, 4 +5 V logic power outputs, 20 COM (and shields), 2 +12 to +15 V dc analog power outputs, 2 –12 to –15 V dc analog power outputs, 4 analog outputs, 9 sampled analog inputs, and 3 analog inputs to VCO	60-pin high density ribbon cable header
XA_	Connector A for ADMA daughterboard that includes the following pin signals: 16 xdata, 4 +5 V, 2 +12/15 V, 2 -12/15 V, 7 DCOM & 1 ACOM, 8 general purpose user definable lines from DSPC board, 4 logic user definable lines from DSPC board, and 16 reserved for future data lines	60-pin high density
XB_	Connector B for ADMA daughterboard that includes the following pin signals: 20 xaddress, 1 0x_cs - daughterboard select, 2 0xread/0xwrite, 1 ID - data, 1 0xconfig - EPLD configure (nCS), 1 0xconfig_status - EPLD configuration status (nSTATUS), 1 clock, 1 signal in - sync signal input, 1 0busy, 1 signal out - interrupt, and 7 DCOM	40-pin high density

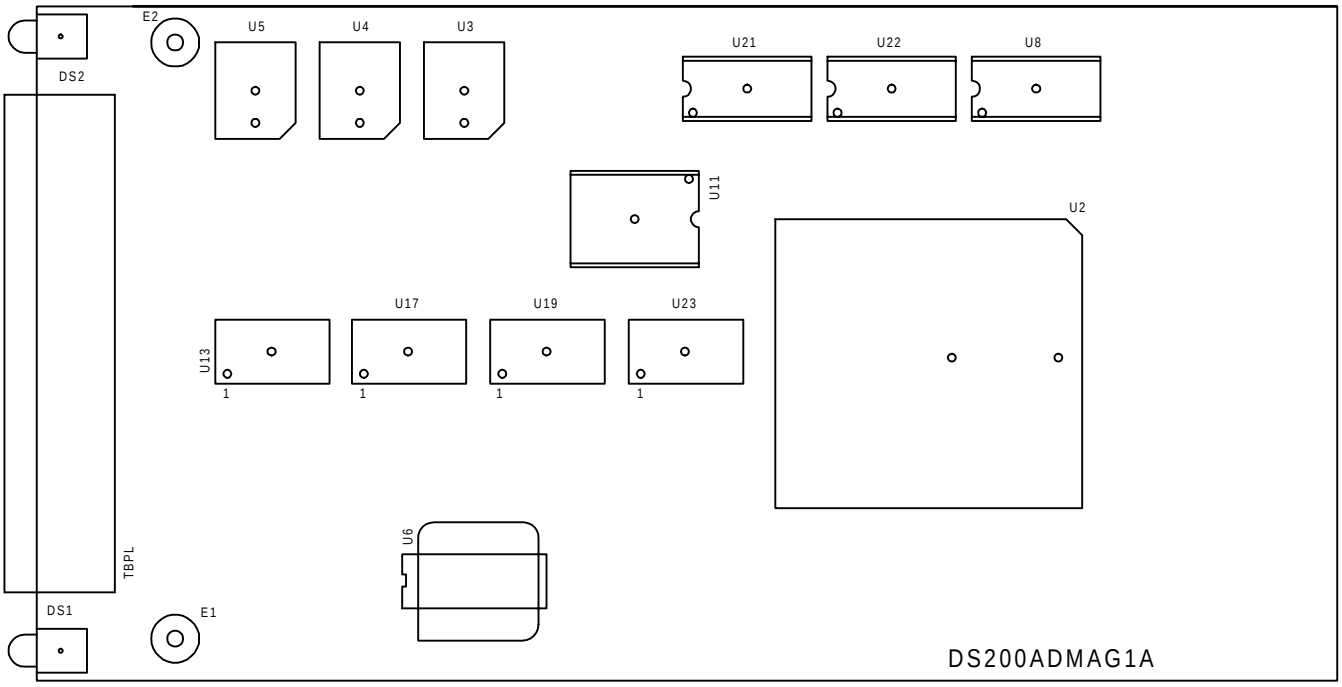

Figure 3. ADMA Board Layout

Table 2. TBPL Interface Port Pin Descriptions (From DDTB Board)

Pin #	Signal	Description
TBPL-1	DCOM	Digital common
TBPL-2	DO1	Digital output #1
TBPL-3	DO2	Digital output #2
TBPL-4	DCOM	Digital common
TBPL-5	DO3	Digital output #3
TBPL-6	DO4	Digital output #4
TBPL-7	DCOM	Digital common
TBPL-8	DO5	Digital output #5
TBPL-9	DO6	Digital output #6
TBPL-10	DCOM	Digital common
TBPL-11	DO7	Digital output #7
TBPL-12	DO8	Digital output #8
TBPL-13	DCOM	Digital common
TBPL-14	DI1	Digital input #1
TBPL-15	DI2	Digital input #2
TBPL-16	DCOM	Digital common
TBPL-17	DI3	Digital input #3
TBPL-18	DI4	Digital input #4
TBPL-19	DCOM	Digital common
TBPL-20	DI5	Digital input #5

Table 2. TBPL Interface Port Pin Descriptions (From DDTB Board) — Continued

Pin #	Signal	Description
TBPL-21	DI6	Digital input #6
TBPL-22	DCOM	Digital common
TBPL-23	DI7	Digital input #7
TBPL-24	DI8	Digital input #8
TBPL-25	DCOM	Digital common
TBPL-26	IDDATA	Identification memory access line
TBPL-27	0TBOK	Terminal board OK interlock
TBPL-28	P5	Positive (+) 5 V dc
TBPL-29	AOUT1	Analog output #1
TBPL-30	P5	Positive (+) 5 V dc
TBPL-31	AOUT2	Analog output #2
TBPL-32	P5	Positive (+) 5 V dc
TBPL-33	AOUT3	Analog output #3
TBPL-34	P5	Positive (+) 5 V dc
TBPL-35	AOUT4	Analog output #4
TBPL-36	P5	Positive (+) 5 V dc
TBPL-37	HSAD0	Analog input to high speed sampled ADC #0
TBPL-38	P5	Positive (+) 5 V dc
TBPL-39	HSAD1	Analog input to high speed sampled ADC #1
TBPL-40	P5	Positive (+) 5 V dc
TBPL-41	HSAD2	Analog input to high speed sampled ADC #2
TBPL-42	P5	Positive (+) 5 V dc
TBPL-43	HSAD3	Analog input to high speed sampled ADC #3
TBPL-44	P5	Positive (+) 5 V dc
TBPL-45	HSAD4	Analog input to high speed sampled ADC #4
TBPL-46	N15	Negative (–) 15 V dc
TBPL-47	HSAD5	Analog input to high speed sampled ADC #5
TBPL-48	N15	Negative (–) 15 V dc
TBPL-49	HSAD6	Analog input to high speed sampled ADC #6
TBPL-50	P15	Positive (+) 15 V dc
TBPL-51	HSAD7	Analog input to high speed sampled ADC #7
TBPL-52	P15	Positive (+) 15 V dc
TBPL-53	HSAD8	Analog input to high speed sampled ADC #8
TBPL-54	ACOM	Analog common
TBPL-55	AVCO0	Analog input to VCO #0
TBPL-56	ACOM	Analog common
TBPL-57	AVCO1	Analog input to VCO #1
TBPL-58	ACOM	Analog common
TBPL-59	AVCO2	Analog input to VCO #2
TBPL-60	ACOM	Analog common

RENEWAL/WARRANTY REPLACEMENT

BOARD PART NUMBER IDENTIFICATION

A printed wiring board is identified by an alphanumeric part (catalog) number stamped on its edge. For example, the ADMA board is identified by part number DS200ADMAG#. Figure 4 describes each digit in the part number.

NOTE

All digits are important when ordering or replacing any board.

WARRANTY TERMS

The GE Motors & Industrial 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 able be obtained separately from the nearest GE Sales Office or authorized GE Sales Representative.

WARRANTY PARTS AND SERVICE

This board has no fuses or other end-user serviceable parts. If it fails, it 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
- LCI serial number and model number
- Board number and description

PROCEDURE FOR REPLACING BOARDS

WARNING

To prevent electric shock, turn off power to the board, then test to verify that no power exists in the board before touching it or any connected circuits.

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 and always store boards in anti-static bags or boxes they were shipped in.

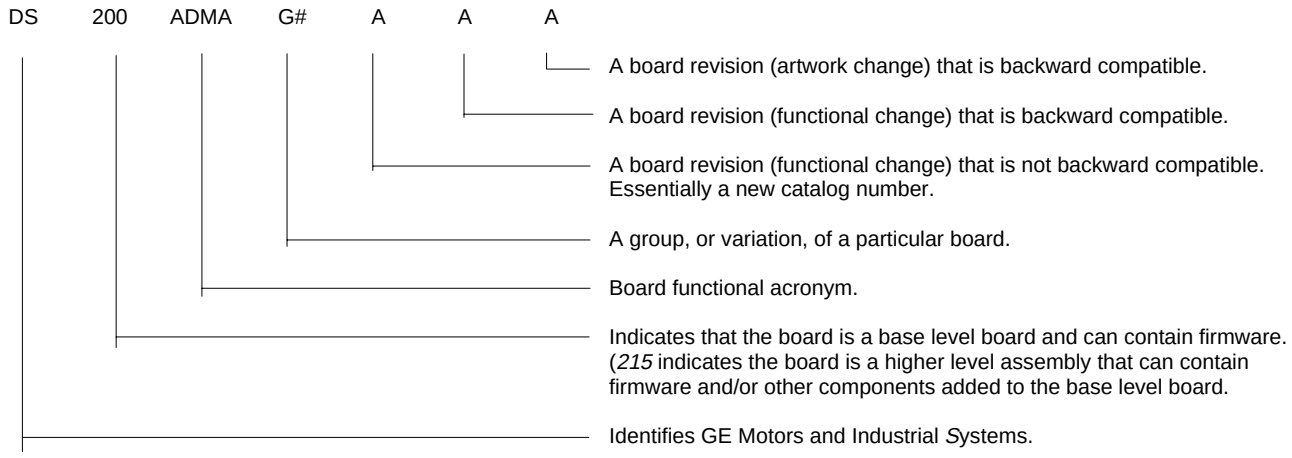

Figure 4. Sample Board Part Number, DS Series

To replace an ADMA board: (see Figures 1, 2, and 5).

1. **Turn off power**.

2. Carefully disconnect all cables connected to the DSPC board faceplate, as follows:
   - For ribbon cables, grasp each side of the cable connector that mates with the board connector, press the metal retaining clips inward, and gently pull the cable connector loose.
   - For cables with pull tabs, carefully pull the tab.

3. Remove the four screws with washers that secure the DSPC board faceplate to the VME rack assembly and set them aside.

CAUTION

Avoid dropping any hardware into the VME rack, which could cause damage.

4. Disconnect the TBPL ribbon cable from the ADMA board by grasping on each side of the cable connector, pressing the metal retaining clips inward, and gently pulling the cable connector loose from the board.

5. Push the two rack release tabs away from the center of the board to disengage the DSPC board P1 and P2 connectors from the VME backplane connector and remove the board from the rack (complete with any daughterboards or blockoffs).

6. Remove the three screws and washers that secure the ADMA board to the standoffs on the DSPC board and set them aside.

7. Grasp the ADMA board by the top and bottom edge and carefully, using a slight rocking motion, pull it loose from the XA_ and XB_ connectors on the DSPC board.

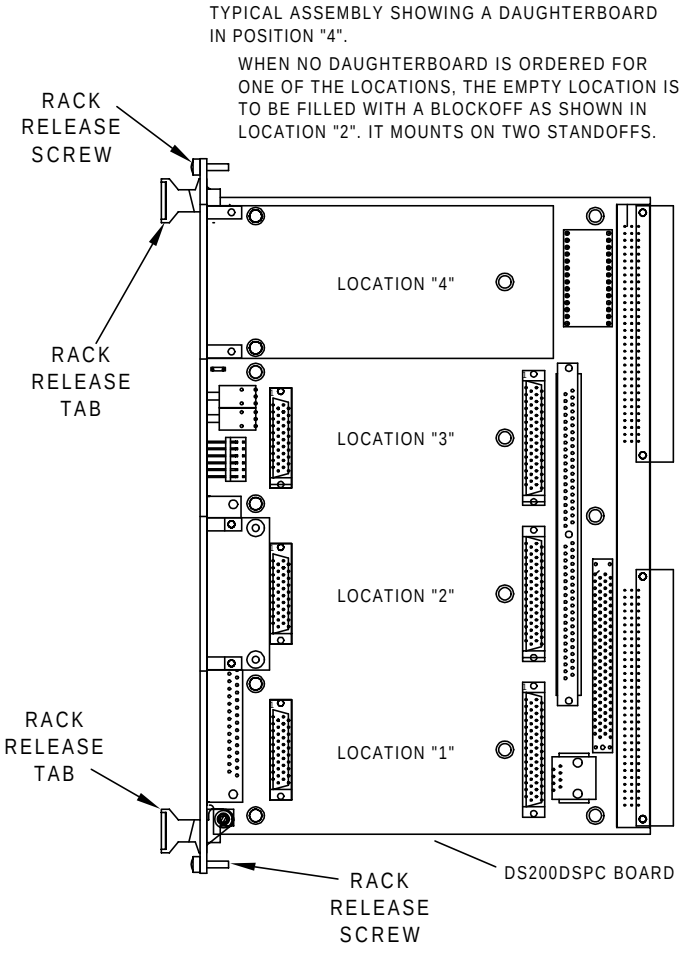

Figure 5. Daughterboard and Blockoff Assemblies

NOTE

Because of upgrades, boards of different revision levels may not contain identical hardware. However, GE Motors & Industrial Systems ensures backward compatibility of replacement boards.

8. Orient the new (replacement) ADMA board onto the XA_ and XB_ connectors of the DSPC board and press it into position.

9. Reinsert and tighten the three screws (with washers) that were removed in step 6 into the standoffs on the DSPC board.

10. Install the DSPC board into the VME rack by carefully aligning the P1 and P2 connectors with the VME backplane connector and pushing the board into its mounted position.

11. Orient the TBPL ribbon cable disconnected in step 4 with the TBPL connector on the ADMA board and carefully insert and press it into seated position

12. Secure the DSPC board to the VME rack assembly with the four screws removed in step 3 and reconnect all cables that were disconnected in step 2. Ensure that each connector is properly seated.

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