GE Industrial Systems

Fiber-Optic Interface Board
IS200FOSBH_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 Industrial Systems.

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.

Contents

Functional Description

The IS200FOSB Fiber-Optic Interface Board (FOSB) is the fiber-optic distribution array board for Innovation Series™ drives. The FOSB board interfaces all signals received from the IS200BICH Bridge Interface and Control Board (BICH) with its IS200BPIH Bridge Personality Board (BPIH) to the bridge power devices. The BICH, BPIH, and FOSB boards provide all of the required gating, protective, feedback interface, and signal processing functions needed to interface the IS200DSPX Digital Signal Processor Control Board (DSPX).

High-density shielded connectors from the faceplates of the BICH and BPIH boards provide the interface with the FOSB board. See Figure 1 for an illustration of these connections.

The FOSB board interfaces 24 gate driver signals for the bridge with the BICH board. The fiber-optic drivers in each phase leg are interlocked in pairs on the FOSB board (S1/S3 and S2/S4) so that it is not physically possible to command them ON simultaneously. This eliminates the possibility of a commanded shoot-through fault.

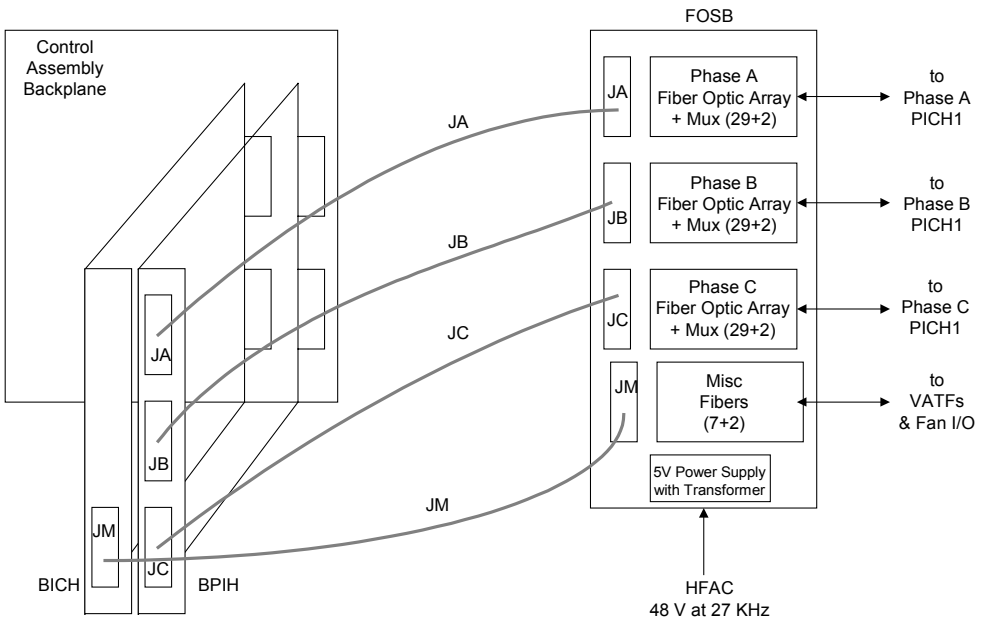


Figure 1. BICH Board, BPIH Subassembly, and FOSB Board Interconnections

The FOSB board multiplexes the gate driver status signals from the BICH/BPIH boards on a per phase basis. The BPIH board interfaces most bridge I/O signals on a per phase basis via three identical high-density shielded cables to the FOSB board. These are assigned to phase A, phase B, and phase C signals. Phase overcurrent faults are also transmitted in these cables (not multiplexed with the other faults). A unique *cable missing* signal is included in each cable. There is also one connector cable, JM, which goes directly to the FOSB board from the BICH board.

Bridge Shutdown Sequences

The FOSB board provides an interruptible power source for the gating fiber-optic connections. There are two types of shutdown procedures, immediate and soft shutdown (SSD). In an immediate shutdown, the power source is interrupted in a two-stage manner to ensure safe bridge shutdown.

- First, power is removed from all outer transistor gate fiber-optic transmitters forcing all outer IGBTs to turn OFF.
- A short delay later (1–2 μs), power is removed from the inner transistor gate fiber-optic transmitters forcing all inner IGBTs to turn OFF.

The two-stage shutdown ensures that the inner transistors do not turn OFF into the full dc bus potential that can occur transiently, if the outer transistors in a half phase leg remain conducting. Immediate shutdown can be initiated by clock faults or reset. A differential disable signal is transmitted from the BICH board. When this disable signal goes true, it will trigger the immediate shutdown process.

The soft shutdown is a 10 μs sequence that slowly turns OFF any conducting IGBTs and reduces voltage stresses on the devices. Soft shutdown is initiated by all other faults controlled by the BICH board (such as bridge faults, local/system faults, software trips and so on).

Bridge Protection

A fail-safe bridge protection logic scheme is provided to protect the converter from open/intermittent cabling between the FOSB board and the BPIH/BICH boards.

The phase gating faults and dc overvoltage fault (DCOV) are multiplexed onto a single differential signal through a phase cable to the BPIH/BICH boards. Under normal conditions this signal will remain in a logic low state.

Once the FOSB board detects a bridge fault, the bridge fault status signal will immediately go high. This signals the BICH board to initiate a soft-shutdown fault sequence.

Each cable from the BPIH/BICH boards to the FOSB board contains two signals to detect problems such as missing or improperly connected cables. If a problem is detected, the BICH board sees a fault.

Bridge protection to ensure fail-safe operation during cable malfunctions is implemented within the FOSB board's and BPIH board's hardware. This function takes into account "abnormal" gating commands (such as a Cell Test) where only one switch may be commanded ON at a time. If the logic detects an invalid switch timing command, the logic must assume that a cabling fault exists and communication with the BICH board is no longer reliable.

When a switch timing fault is detected, the entire phase (all 8 switches) is sequenced OFF in a two-stage shutdown and then remains OFF until the proper fault reset sequence from the BICH board is received. A switch timing fault will permanently hold the bridge fault status signal until reset. The loss of a cable is detected as a fault in the hardware. There are many conditions that may cause the bridge to shutdown, but cable malfunction and power supply undervoltage (PSUV) are the only two controlled by the FOSB board. A PSUV fault from the FOSB board's power supply monitor will also latch the FOSB board's state sequencer in a fault state and trigger a two-stage shutdown.

Control Power

The FOSB board utilizes 48 V ac, 27 kHz input power from the IS200GDPA High Frequency Power Supply Board. The power supply section of the FOSB board provides the control power transformer and 5 V switch mode power supply. PSUV detection is provided for P5 and gating is disabled if PSUV is detected.

Application Data

The FOSB board has no fuses or adjustable hardware. The board has two testpoints, two stab-on connectors, and six plug connectors. It also includes 102 fiber-optic connectors, each with an LED indicator. See Figure 2 for a board layout diagram that shows the locations of these components and the following tables for signal descriptions:

Table	Description
1	Testpoints TP1 and TP2
2	Stab-on connectors E1 and E2
3	Plug connectors J1 and J2
4	Plug connectors JA, JB, and JC
5	Plug connector JM
6	Phase A fiber-optic connectors and their respective LEDs
7	Phase B fiber-optic connectors and their respective LEDs
8	Phase C fiber-optic connectors and their respective LEDs
9	Auxiliary fiber-optic connectors and their respective LEDs

Table 1. FOSB Board Testpoints TP1 and TP2

Testpoint	Nomenclature	Description
TP1	DCOM	Digital Common
TP2	P5	Positive 5 V dc Control Power

Table 2. FOSB Board Stab-On Connectors E1 and E2

Stab	Nomenclature	Description
E1	Chassis	Chassis Ground
E2	DCOM	Digital Common

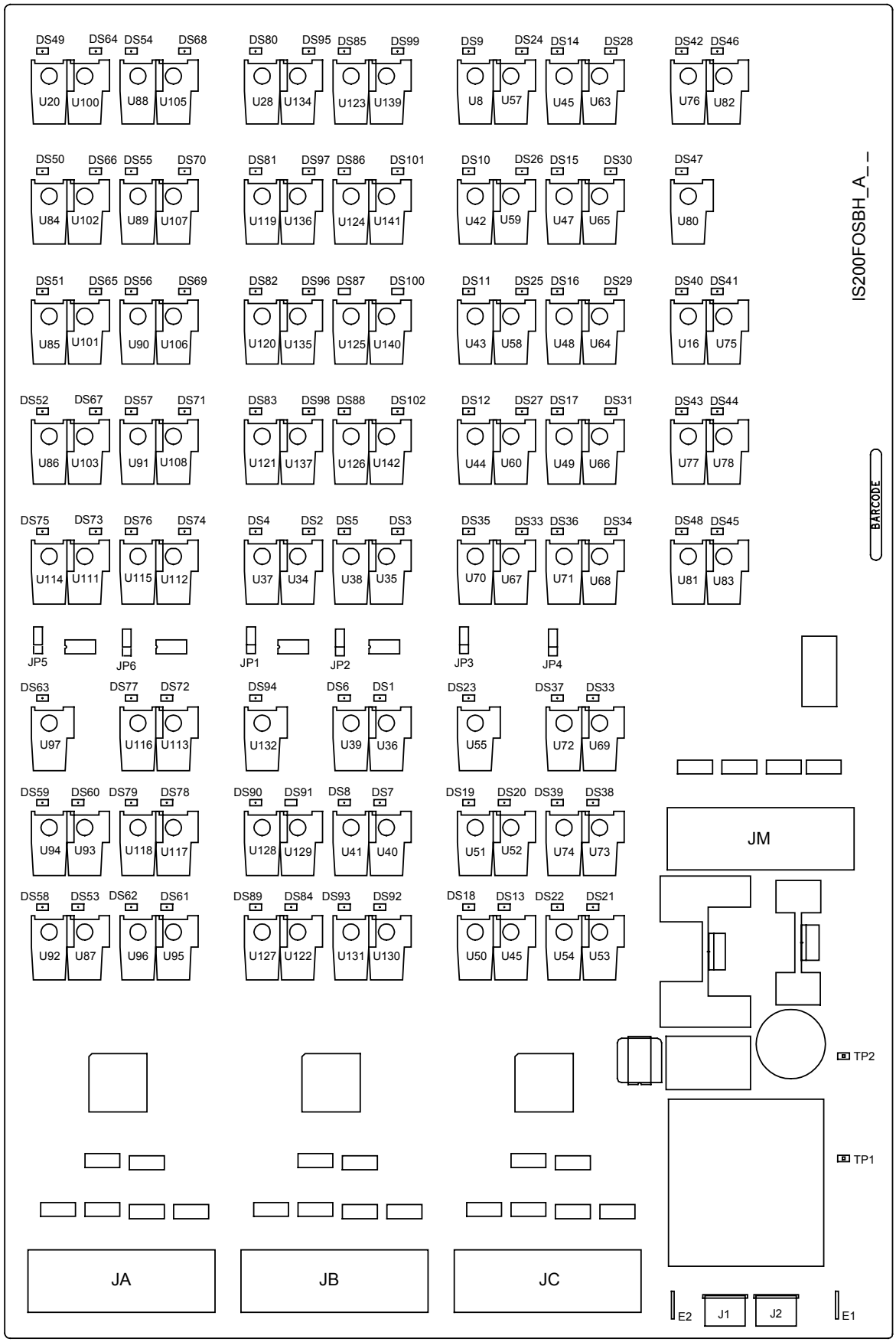


Figure 2. FOSB Board Layout Diagram

Table 3. FOSB Board Connectors J1 and J2 (Interface with GDPA Board)

Pin No.	Nomenclature	Description
1	HF1	High Frequency (48 V ac, 27 kHz) Power Supply Input from GDPA Board
2	HFSH	Connector Shield
3	HF2	High Frequency (48 V ac, 27 kHz) Power Supply Return to GDPA Board

*Table 4. BPIH Subassembly Connectors JA, JB, JC Pin Signal Descriptions**

Pin No.	Nomenclature	Description
1	_ FLTN	Phase_ faults serial data (11 faults multiplexed) differential signal negative
2	_ FLTP	Phase_ faults serial data (11 faults multiplexed) differential signal positive
3	_ DCNN	Phase_ negative dc bus voltage VCO feedback differential signal negative
4	_ DCNP	Phase_ negative dc bus voltage VCO feedback differential signal positive
5	_ DCPN	Phase_ positive dc bus voltage VCO feedback differential signal negative
6	_ DCPP	Phase_ positive dc bus voltage VCO feedback differential signal positive
7	_ VFBN	Phase_ motor voltage VCO feedback differential signal negative
8	_ VFBP	Phase_ motor voltage VCO feedback differential signal positive
9	_ IFBN	Phase_ motor current VCO feedback differential signal negative
10	_ IFBP	Phase_ motor current VCO feedback differential signal positive
11	_ DBRVN	Phase_ DB resistor voltage VCO feedback differential signal negative
12	_ DBRVP	Phase_ DB resistor voltage VCO feedback differential signal positive
13	_ TFBN	Phase_ temperature VCO feedback differential signal negative
14	_ TFBP	Phase_ temperature VCO feedback differential signal positive
15	_ IFBSN	Phase_ current fault differential signal negative
16	_ G_1MN	Phase_ motor IGBT #1 gate drive output differential signal negative
17	_ G_1MP	Phase_ motor IGBT #1 gate drive output differential signal positive
18	_ G_2MN	Phase_ motor IGBT #2 gate drive output differential signal negative
19	_ G_2MP	Phase_ motor IGBT #2 gate drive output differential signal positive
20	_ G_3MN	Phase_ motor IGBT #3 gate drive output differential signal negative
21	_ G_3MP	Phase_ motor IGBT #3 gate drive output differential signal positive
22	_ G_4MN	Phase_ motor IGBT #4 gate drive output differential signal negative
23	_ G_4MP	Phase_ motor IGBT #4 gate drive output differential signal positive
24	_ G_1NN	Phase_ neutral IGBT #1 gate drive output differential signal negative

* The underscore character (_) signifies the applicable phase at its first use in a description.

Table 4. BPIH Subassembly Connectors JA, JB, JC Pin Signal Descriptions (continued)*

Pin No.	Nomenclature	Description
25	_ G_1NP	Phase_ neutral IGBT #1 gate drive output differential signal positive
26	_ G_2NN	Phase_ neutral IGBT #2 gate drive output differential signal negative
27	_ G_2NP	Phase_ neutral IGBT #2 gate drive output differential signal positive
28	_ G_3NN	Phase_ neutral IGBT #3 gate drive output differential signal negative
29	_ G_3NP	Phase_ neutral IGBT #3 gate drive output differential signal positive
30	_ IFBSP	Phase_ current fault differential signal positive
31	_ DBTRIPN	Phase_ DB trip differential signal negative
32	_ DBTRIPP	Phase_ DB trip differential signal positive
33	_ G_4NN	Phase_ neutral IGBT #4 gate drive output differential signal negative
34	_ G_4NP	Phase_ neutral IGBT #4 gate drive output differential signal positive
35	_ G_DB1N	Phase_ DB IGBT #1 gate drive output differential signal negative
36	_ G_DB1P	Phase_ DB IGBT #1 gate drive output differential signal positive
37	_ G_DB2N	Phase_ DB IGBT #2 gate drive output differential signal negative
38	_ G_DB2P	Phase_ DB IGBT #2 gate drive output differential signal positive
39	_ RX1N	Phase_ spare receiver #1 differential signal negative
40	_ RX1P	Phase_ spare receiver #1 differential signal positive
41	_ TX1N	Phase_ spare transmitter #1 differential signal negative
42	_ TX1P	Phase_ spare transmitter #1 differential signal positive
43	J_ CHK1	Phase_ FOSB board to BPIH board cable check signal #1
44	J_ CHK2	Phase_ FOSB board to BPIH board cable check signal #2
45, 46	CHASSIS	Screw terminal connection to chassis ground

* The underscore character (_) signifies the applicable phase at its first use in a description.

Table 5. FOSB Board Connector JM Pin Signal Descriptions

Pin No.	Nomenclature	Description
1	FLT1N	Extra fault line 1 (RS422 negative)
2	FLT1P	Extra fault line 1 (RS422 positive)
3	M_UCAN	Motor VBA line-to-line voltage VCO feedback (RS422 negative)
4	M_UCAP	Motor VBA line-to-line voltage VCO feedback (RS422 positive)
5	M_UBAN	Motor VCA line-to-line voltage VCO feedback (RS422 negative)
6	M_UBAP	Motor VCA line-to-line voltage VCO feedback (RS422 positive)
7	S_UCAN	Source VBA line-to-line voltage VCO feedback (RS422 negative)
8	S_UCAP	Source VBA line-to-line voltage VCO feedback (RS422 positive)
9	S_UBAN	Source VCA line-to-line voltage VCO feedback (RS422 negative)
10	S_UBAP	Source VCA line-to-line voltage VCO feedback (RS422 positive)
11	UMIDN	Midpoint voltage VCO feedback (RS422 negative)
12	UMIDP	Midpoint voltage VCO feedback (RS422 positive)
13	FANSN	Fan status line (RS422 negative)
14	FANSP	Fan status line (RS422 positive)
15	DCOM	Digital Common
16	GDISABLEN	Gate drive disable (RS422 negative)
17	GDISABLEP	Gate drive disable (RS422 positive)
18	OBR_FLTN	Bridge fault signal for FOSB board EPLDs to allow soft shutdown (active low, RS422 negative)
19	OBR_FLTP	Bridge fault signal for FOSB board EPLDs to allow soft shutdown (active low, RS422 positive)
20	BRD_ID	Board identification line
21	OJM_CHK1	JM cable fault line 1
22	OJM_CHK2	JM cable fault line 2
23	DCOM	Digital Common
24	OFLT_RSTN	Fault reset signal (reset = low, RS422 negative)
25	OFLT_RSTP	Fault reset signal (reset = low, RS422 positive)
26, 27	N/C	Not Connected
28	FANTXN	Fan speed control (RS422 negative)
29	FANTXP	Fan speed control (RS422 positive)

*If this cable is swapped with JA, JB, or JC of BPIH board, then gating will be disabled via pin arrangements.

Table 5. FOSB Board Connector JM Pin Signal Descriptions (continued)*

Pin No.	Nomenclature	Description
30	0RLYS	Gate drive power supply relay status (low = ON)
31 – 34	N/C	Not Connected
35, 36	DCOM	Digital Common
37	DRV_P5	Gate drive positive 5 V dc
38	DCOM	Digital Common
39	PWROKN	Voltage isolation OK from CPFP board (RS422 negative)
40	PWROKP	Voltage isolation OK from CPFP board (RS422 positive)
41	TESTN	Spare transmitter (RS422 negative)
42	TESTP	Spare transmitter (RS422 positive)
43, 44	N/C	Not Connected
45, 46	CHASSIS	Screw terminal connection to chassis ground

*If this cable is swapped with JA, JB, or JC of BPIH board, then gating will be disabled via pin arrangements.

Table 6. FOSB Board Phase A Fiber-Optic Connectors

Connector	Color	Nomenclature	LED*	Description
U20	Blue	S1M-S	DS49	Gate driver S1M status feedback
U100	Gray	S1M-G	DS64	Gate driver S1M gating command
U88	Blue	S1N-S	DS54	Gate driver S1N status feedback
U105	Gray	S1N-G	DS68	Gate driver S1N gating command
U84	Blue	S2M-S	DS50	Gate driver S2M status feedback
U102	Gray	S2M-G	DS66	Gate driver S2M gating command
U89	Blue	S2N-S	DS55	Gate driver S2N status feedback
U107	Gray	S2N-G	DS70	Gate driver S2N gating command
U85	Blue	S3M-S	DS51	Gate driver S3M status feedback
U101	Gray	S3M-G	DS65	Gate driver S3M gating command
U90	Blue	S3N-S	DS56	Gate driver S3N status feedback
U106	Gray	S3N-G	DS69	Gate driver S3N gating command
U86	Blue	S4M-S	DS52	Gate driver S4M status feedback
U103	Gray	S4M-G	DS67	Gate driver S4M gating command
U91	Blue	S4N-S	DS57	Gate driver S4N status feedback
U108	Gray	S4N-G	DS71	Gate driver S4N gating command
U114	Blue	DB1-S	DS75	Dynamic braking circuit 1 status feedback
U111	Gray	DB1-G	DS73	Dynamic braking circuit 1 gating command
U115	Blue	DB2-S	DS76	Dynamic braking circuit 2 status feedback
U112	Gray	DB2-G	DS74	Dynamic braking circuit 2 gating command
U97	Blue	TFB	DS63	Heatsink temperature feedback
U116	Blue	SPARE-RX	DS77	Spare receiver connector
U113	Gray	SPARE-TX	DS72	Spare transmitter connector
U93	Blue	IFB-S	DS59	Current feedback circuit status
U94	Blue	IFB-I	DS60	Current feedback
U118	Blue	DBTRP	DS79	Dynamic braking trip
U117	Blue	DBRV	DS78	Dynamic braking voltage feedback
U92	Blue	VDC-N	DS58	Dc bus negative voltage feedback
U87	Blue	VDC-P	DS53	Dc bus positive voltage feedback
U96	Blue	DCOV	DS62	Dc overvoltage
U95	Blue	VFB	DS61	Ac voltage feedback

*A red diagnostic LED is provided for each fiber-optic connector. The LED lights when the interface of that connector is operating correctly.

Table 7. FOSB Board Phase B Fiber-Optic Connectors

Connector	Color	Nomenclature	LED*	Description
U28	Blue	S1M-S	DS80	Gate driver S1M status feedback
U134	Gray	S1M-G	DS95	Gate driver S1M gating command
U123	Blue	S1N-S	DS85	Gate driver S1N status feedback
U139	Gray	S1N-G	DS99	Gate driver S1N gating command
U119	Blue	S2M-S	DS81	Gate driver S2M status feedback
U136	Gray	S2M-G	DS97	Gate driver S2M gating command
U124	Blue	S2N-S	DS86	Gate driver S2N status feedback
U141	Gray	S2N-G	DS101	Gate driver S2N gating command
U120	Blue	S3M-S	DS82	Gate driver S3M status feedback
U135	Gray	S3M-G	DS96	Gate driver S3M gating command
U125	Blue	S3N-S	DS87	Gate driver S3N status feedback
U140	Gray	S3N-G	DS100	Gate driver S3N gating command
U121	Blue	S4M-S	DS83	Gate driver S4M status feedback
U137	Gray	S4M-G	DS98	Gate driver S4M gating command
U126	Blue	S4N-S	DS88	Gate driver S4N status feedback
U142	Gray	S4N-G	DS102	Gate driver S4N gating command
U37	Blue	DB1-S	DS4	Dynamic braking circuit 1 status feedback
U34	Gray	DB1-G	DS2	Dynamic braking circuit 1 gating command
U38	Blue	DB2-S	DS5	Dynamic braking circuit 2 status feedback
U35	Gray	DB2-G	DS3	Dynamic braking circuit 2 gating command
U132	Blue	TFB	DS94	Heatsink temperature feedback
U39	Blue	SPARE-RX	DS6	Spare receiver connector
U36	Gray	SPARE-TX	DS1	Spare transmitter connector
U128	Blue	IFB-S	DS90	Current feedback circuit status
U129	Blue	IFB-I	DS91	Current feedback
U41	Blue	DBTRP	DS8	Dynamic braking trip
U40	Blue	DBRV	DS7	Dynamic braking voltage feedback
U127	Blue	VDC-N	DS89	Dc bus negative voltage feedback
U122	Blue	VDC-P	DS84	Dc bus positive voltage feedback
U131	Blue	DCOV	DS93	Dc overvoltage
U130	Blue	VFB	DS92	Ac voltage feedback

*A red diagnostic LED is provided for each fiber-optic connector. The LED lights when the interface of that connector is operating correctly.

Table 8. FOSB Board Phase C Fiber-Optic Connectors

Connector	Color	Nomenclature	LED*	Description
U8	Blue	S1M-S	DS9	Gate driver S1M status feedback
U57	Gray	S1M-G	DS24	Gate driver S1M gating command
U45	Blue	S1N-S	DS14	Gate driver S1N status feedback
U63	Gray	S1N-G	DS28	Gate driver S1N gating command
U42	Blue	S2M-S	DS10	Gate driver S2M status feedback
U59	Gray	S2M-G	DS26	Gate driver S2M gating command
U47	Blue	S2N-S	DS15	Gate driver S2N status feedback
U65	Gray	S2N-G	DS30	Gate driver S2N gating command
U43	Blue	S3M-S	DS11	Gate driver S3M status feedback
U58	Gray	S3M-G	DS25	Gate driver S3M gating command
U48	Blue	S3N-S	DS16	Gate driver S3N status feedback
U64	Gray	S3N-G	DS29	Gate driver S3N gating command
U44	Blue	S4M-S	DS12	Gate driver S4M status feedback
U60	Gray	S4M-G	DS27	Gate driver S4M gating command
U49	Blue	S4N-S	DS17	Gate driver S4N status feedback
U66	Gray	S4N-G	DS31	Gate driver S4N gating command
U70	Blue	DB1-S	DS35	Dynamic braking circuit 1 status feedback
U67	Gray	DB1-G	DS33	Dynamic braking circuit 1 gating command
U71	Blue	DB2-S	DS36	Dynamic braking circuit 2 status feedback
U68	Gray	DB2-G	DS34	Dynamic braking circuit 2 gating command
U55	Blue	TFB	DS23	Heatsink temperature feedback
U72	Blue	SPARE-RX	DS37	Spare receiver connector
U69	Gray	SPARE-TX	DS32	Spare transmitter connector
U51	Blue	IFB-S	DS19	Current feedback circuit status
U52	Blue	IFB-I	DS20	Current feedback
U74	Blue	DBTRP	DS39	Dynamic braking trip
U73	Blue	DBRV	DS38	Dynamic braking voltage feedback
U50	Blue	VDC-N	DS18	Dc bus negative voltage feedback
U45	Blue	VDC-P	DS13	Dc bus positive voltage feedback
U54	Blue	DCOV	DS22	Dc overvoltage
U53	Blue	VFB	DS21	Ac voltage feedback

*A red diagnostic LED is provided for each fiber-optic connector. The LED lights when the interface of that connector is operating correctly.

Table 9. FOSB Board Auxiliary Fiber-Optic Connectors

Connector	Color	Nomenclature	LED*	Description
U76	Blue	PWROK	DS42	Power supply OK
U82	Gray	TEST	DS46	Test output
U80	Blue	VMID	DS47	Motor mid voltage feedback
U16	Blue	SRC-VCA	DS40	Source line-to-line voltage feedback for phase C
U75	Blue	SRC-VBA	DS41	Source line-to-line voltage feedback for phase B
U77	Blue	MTR-VCA	DS43	Motor line-to-line voltage feedback for phase C
U78	Blue	MTR-VBA	DS44	Motor line-to-line voltage feedback for phase B
U81	Blue	FAN-RX	DS48	Fan status feedback
U83	Gray	FAN-TX	DS45	Fan power output

*A red diagnostic LED is provided for each fiber-optic connector. The LED lights when the interface of that connector is operating correctly.

Renewal/Warranty Replacement

How to Order a Board

When ordering a replacement board for a GE drive, you need to know:

- How to accurately identify the part
- If the part is under warranty
- How to place the order

This information helps ensure that GE can process the order accurately and as soon as possible.

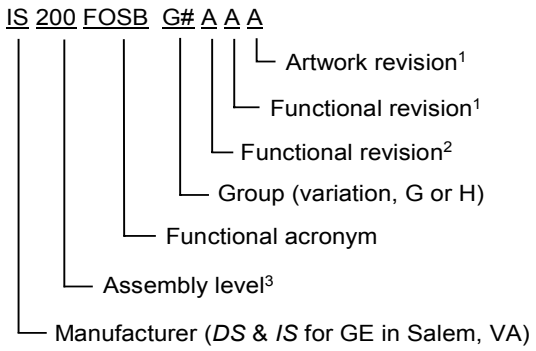
Board Identification

A printed wiring board is identified by an alphanumeric **part (catalog) number** located near its edge. Figure 3 explains the structure of the part number.

The board's functional acronym, shown in Figure 3, normally is based on the **board description**, or name. For example, the FOSB board is described as the Fiber-Optic Interface Board.

Warranty Terms

The GE *Terms and Conditions* brochure details product warranty information, including **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.



[1]Backward compatible
[2]Not backward compatible
[3]*200* indicates a base-level board; *215* indicates a higher-level assembly or added components (such as PROM)

Figure 3. Board Part Number Conventions

Placing the Order

Parts still under **warranty** may be obtained directly from the factory:

GE Industrial Systems
Product Service Engineering
1501 Roanoke Blvd.
Salem, VA 24153-6492 USA
Phone: +1 540 387 7595
Fax: +1 540 387 8606
(Replace + with the international access code.)

Renewals (spares or those not under warranty) should be ordered by contacting the nearest GE Sales or Service Office. Be sure to include:

- Complete part number and description
- Drive serial number
- Drive Material List (ML) number

Note

All digits are important when ordering or replacing any board.

The factory may substitute later versions of boards based on availability and design enhancements. However, GE Industrial Systems ensures backward compatibility of replacement boards.

How to Replace the Board

Handling Precautions

To prevent component damage caused by static electricity, treat all boards with static sensitive handling techniques. Wear a wrist grounding strap when handling boards or components, but only after boards or components have been removed from potentially energized equipment and are at a normally grounded workstation.

Printed wiring boards may contain static-sensitive components. Therefore, GE ships all replacement boards in antistatic bags. Use the following guidelines when handling boards:

- Store boards in antistatic bags or boxes.
- Use a grounding strap when handling boards or board components (per above *Caution* criteria).

Replacement Procedures

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

To prevent equipment damage, do not remove, insert, or adjust board connections while power is applied to the equipment.

Remove the FOSB board as follows:

1. Make sure that the drive in which the board resides has been de-energized and follow all local safety practices of Lock-Out/Tag-Out.

2. Open the control cabinet door and, using equipment designed for high voltages, test any electrical circuits **before touching them** to ensure that power is off.

3. Carefully disconnect all cables from the FOSB board to be replaced as follows:
   - Verify cables are labeled with the correct connector name (as marked on the board) to simplify reconnection.
   - For ribbon cables, grasp each side of the cable connector that mates with the board connector and gently pull the cable connector loose.
   - For cables with pull-tabs, carefully pull the tab.
   - For fiber-optic cables, depress the latch on the mating connector and remove the fiber-optic cable.

Avoid dropping mounting hardware into the unit, which could cause damage.

4. Remove the nine metal nuts with washers from the nine standoffs and remove the board from the standoffs.

Install the new (replacement) FOSB board as follows:

1. Orient the board in the same position as the board that was removed and place it onto the nine stand-offs.

2. Place the nine washers and nuts onto the stand-offs and fully tighten the metal nuts to secure in the board in place.

3. Reconnect all electrical connections that were disconnected in step 3 of *removing the board*.

4. Close the control cabinet door.

GE Industrial Systems

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