GE Motors & Industrial Systems

LAN COMMUNICATIONS CARD

DS215SLCCG_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.

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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 DS215SLCCG_A_ _ card (SLCC) contains both isolated and non-isolated circuits for communications to the drive or exciter. The SLCC features a 16-position alphanumeric display (and display controller, U18) that connects to the programmer module. The programmer module mounts on the SLCC and plugs into connector KPPL.

The principal microprocessor on the SLCC is the LAN Control Processor, U1 (LCP). The LCP software is stored in two replaceable EPROMs (U6 and U7). The LCP dedicated RAM is provided by U8 and U9. Dual-ported RAM (U5) is used for communications between the LCP and and the Drive Control Processor (DCP) on the DS215SDCC Drive Control Card (SDCC) via 3PL. (Dual-ported RAM [DPR] is RAM configured as memory arrays that can be independently and simultaneously accessed by two microprocessors.)

CARD GROUPS

There are currently three group numbers of the SLCC available (G3 versions were never manufactured). The variations between the groups are as follows:

- DS215SLCCG1A_ _: Includes the circuitry used to connect the drive to both DLAN and ARCNET® networks
- DS215SLCCG2A_ _: Includes the circuitry used to connect the drive to DLAN networks only
- DS215SLCCG4A_ _: Does not include either DLAN or ARCNET circuitry

CARD CONNECTIONS

The SLCC interfaces with the other boards of the controller, external signals, and the network via five connectors (designated _PL). See Figure 1 for an SLCC layout diagram showing the locations of the connectors and Tables 2 – 6 for the pin signals of each connector. Connectors to other boards are as follows:

- 2PL – ±5, 15, and 24 V dc I/O between the Power Supply/Interface Board (DS200IMCP, DCI, SDCI, or DCFB), Drive Terminal Board (531X305NTBA) or Simple Drive Terminal Board (DS200STBA), Drive Control Card (DS200SDCC), and the SLCC
- 3PL – SLCC inputs from the Drive Control Card (DS200SDCC)
- 10PL – I/O between the LAN I/O Terminal Board (531X307LTB) and the SLCC
- ARCPL – I/O between DLAN and ARCNET signals and the SLCC
- KPPL – I/O between the Programmer Module keypad and the SLCC

BOARD MOUNTING

The SLCC is mounted on four standoffs located on the SDCC. The programmer module plugs into connector KPPL on the SLCC and its keypad and cover snap over the SLCC.

NOTE

The four posts (ST1, ST2, ST3, and ST4) located at the end of the programmer module's alphanumeric display on the SLCC are present to protect the glass tip of the display (evacuation point). These are not testpoints.

APPLICATION DATA

CONFIGURABLE HARDWARE

The SLCC includes configurable hardware that must be set correctly for the application:

- Berg-type (manually movable) hardware jumpers, identified by a *JP* nomenclature (see Table 2)
- Wire jumpers, identified by a *WJ* nomenclature (see Table 2)

These jumpers are used for factory test or user application options. Most of the jumper selections have been factory set. The test data sheets supplied with each controller (in the drive/exciter door pocket) indicate these factory set positions. Table 1 lists the jumper descriptions, showing the default setting first.

Figure 1 is a layout diagram of the SLCC, showing the locations of all jumpers.

NOTE

A DS215SLCC card can be used to replace a 531X306LCC card (LCC). If replacing an LCC with an SLCC, refer to publication GEI-100021, Tables 1, 2, and 3 for LCC jumper position settings. Set jumpers on the SLCC so that the respective *functions* of the jumpers are the same as on the LCC being replaced. Do not move software (U6 and U7) from the LCC to the SLCC.

SOFTWARE

The SLCC's LAN Control Processor (LCP) software in EPROMs U6 and U7 cannot be configured in the field. The U6 and U7 EPROMs are replaceable and can be moved from one board to another.

When ordering replacement boards, note that the DS200SLCC does not include the two EROMs mentioned previously (the sockets are empty). The EPROMs from the old board must be moved to the replacement board.

When replacing an SLCC (or LCC) and the EPROMs are needed, specify a DS215SLCC as a replacement to ensure that the two EPROMs are included.

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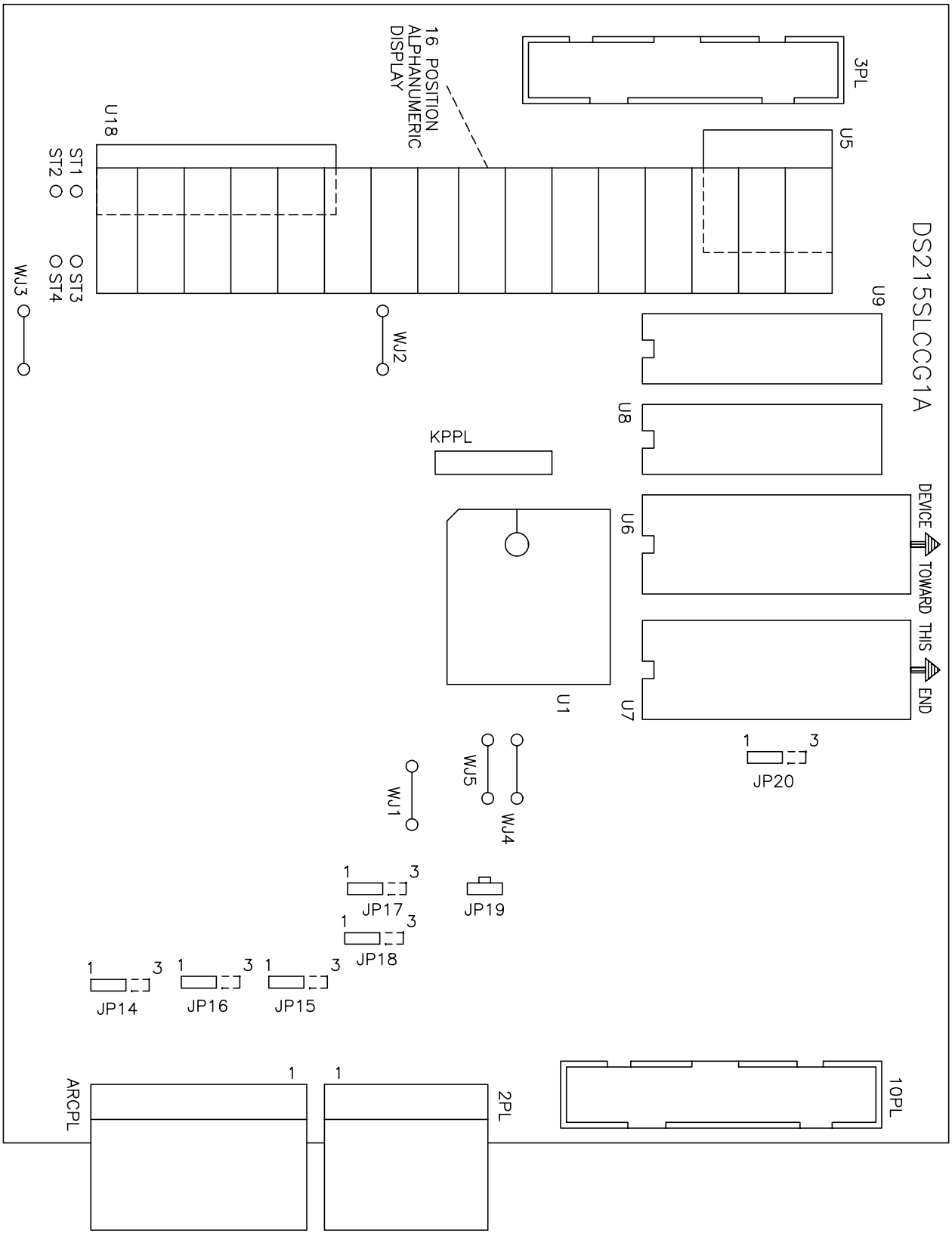

Figure 1. SLCC Layout Diagram

I/O TABLES

Tables 2 – 6 list the I/O pin signals of the different connectors on the SLCC board. The tables are organized as follows:

- **Table 2** – 2PL, ±5, 15, and 24 V dc I/O between the Power Supply/Interface Board (DS200IMCP, DCI, SDCI, or DCFB), Drive Terminal Board (531X305NTBA) or Simple Drive Terminal Board (DS200STBA), Drive Control Card (DS200SDCC) and the SLCC
- **Table 3** – 3PL, SLCC inputs from the Drive Control Card (DS200SDCC)
- **Table 4** – 10PL, I/O between the LAN I/O Terminal Board (531X307LTB) and the SLCC
- **Table 5** – ARCPL, I/O between DLAN and ARCNET signals and the SLCC
- **Table 6** – KPPL, I/O between the Programmer Module keypad and the SLCC

NOTE

The following table defines the jumpers used on the SLCC. The Revision column designates the card's revision for the item described. The Group column designates the card groups that the item applies to. The Name column indicates the item's identification as marked on the card (JP = jumper, WJ = wire jumper). The Description column designates the card function for the item.

Table 1. SLCC Jumpers and Wire Jumpers

Revision	Group	Name	Description
All	1 & 2 Only	JP14	Selects the RS-422 DLAN drivers or the isolated DLAN circuit 1.2 Isolated DLAN circuit 2.3 RS-422 DLAN drivers and receivers
All	1 & 2 Only	JP15	Selects the RS-422 DLAN drivers or the isolated DLAN circuit 1.2 Isolated DLAN circuit 2.3 RS-422 DLAN drivers and receivers
All	1 & 2 Only	JP16	Selects the RS-422 DLAN drivers or the isolated DLAN circuit 1.2 Isolated DLAN circuit 2.3 RS-422 DLAN drivers and receivers
All	1 & 2 Only	JP17	Places the DLAN termination resistors in the DLAN circuit The termination resistors should be added to the drives located at the end of a daisy-chain RS-422 DLAN. Never exceed five sets of termination resistors in an RS-422 DLAN circuit. 1.2 Termination resistors in 2.3 Termination resistors out
All	1 & 2 Only	JP18	Places the DLAN termination resistors in the DLAN circuit The termination resistors should be added to the drives located at the end of a daisy-chain RS-422 DLAN. Never exceed five sets of termination resistors in an RS-422 DLAN circuit. 1.2 Termination resistors in 2.3 Termination resistors out
All	1, 2, & 4	JP19	Connects the crystal to the processor 1.2 Normal operation 2.3 Manufacturing test only

Table 1. SLCC Jumpers and Wire Jumpers — Continued

Revision	Group	Name	Description
ACC–Pres	1, 2, & 4	WJ1	Redirects the Ready Line when there is no ARCNET module - This jumper should be in place when there is no ARCNET module 1.2 No ARCNET module, SLCC G2 and G4 0 ARCNET module present, SLCC G1
ACC–Pres	1, 2, & 4	WJ2	Conects the LRX signal to ground through a 470 ohm resistor - This jumper should be in place for G4 cards only 0 LRX signal not connected to ground, SLCC G1 and G2 1.2 LRX signal connected to ground, SLCC G4
ACC–Pres	1, 2, & 4	WJ3	Conects the T2CLK signal to ground through a 470 ohm resistor - This jumper should be in place for G4 cards only 0 T2CLK signal not connected to ground, SLCC G1 and G2 1.2 T2CLK signal connected to ground, SLCC G4
ACC–Pres	1, 2, & 4	WJ4	Conects the input signal to ground through a 470 ohm resistor - This jumper should be in place for G4 cards only 0 Input signal not connected to ground, SLCC G1 and G2 1.2 Input signal connected to ground, SLCC G4
ACC–Pres	1, 2, & 4	WJ5	Conects the input signal to ground through a 470 ohm resistor - This jumper should be in place for G4 cards only 0 Input signal not connected to ground, SLCC G1 and G2 1.2 Input signal connected to ground, SLCC G4

Table 2. Connector 2PL,
I/O Between the Power Supply/Interface Board (DS200IMCP, DCI, SDCI, or DCFB), Drive Terminal Board (531X305NTBA) or Simple Drive Terminal Board (DS200STBA), Drive Control Card (DS200SDCC), and the SLCC

Pin No.	Nomenclature	Description
1	/PSEN	Power supply enable.
2	N15	Negative 15 V dc to the SDCC, SLCC, and NTB/3TB or STBA boards.
3	P15	Positive 15 V dc to the SDCC, SLCC, and NTB/3TB or STBA boards.
4	DCOM	±15 V dc common to the SDCC, SLCC, and NTB/3TB or STBA boards.
5	P5	Positive 5 V dc to the SDCC, SLCC, and NTB/3TB or STBA boards.
6	P5	Positive 5 V dc to the SDCC, SLCC, and NTB/3TB or STBA boards.
7	DCOM	Positive 5 V dc common to the SDCC, SLCC, and NTB/3TB or STBA boards.
8	N24	Negative 24 V dc to the SDCC, SLCC, and NTB/3TB or STBA boards.
9	P24	Positive 24 V dc to the SDCC, SLCC, and NTB/3TB or STBA boards.

Table 3. Connector 3PL,
SLCC Input From SDCC

Pin No.	Nomenclature	Description
1 - 8	BD0 - BD7	Buffered, demultiplexed SDCC Drive Control Processor (DCP) data bus lines 0 - 7
9	DCOM	Power supply return (common)
10	P5	Positive 5 V dc regulated power supply for digital circuitry
11	/RST3	System reset signal (active low)
12	LINT	Interrupt from SLCC/SDCC microapplication chip to DCP
13	/LBSY	Busy bus control handshake to DCP
14	BA12	Buffered address latch enable from DCP
15	DCOM	Power supply return (common)
16	/BCSL	SLCC chip select
17	/BRD	Buffered read control line from DCP
18	/BWR	Buffered write control line from DCP
19	BA8	Buffered, demultiplexed DCP address line 8
20	BA9	Buffered, demultiplexed DCP address line 9
21	/BCSU	SDCC microapplication chip select
22	BA10	Buffered, demultiplexed DCP address line 10
23	BA11	Buffered, demultiplexed DCP address line 11
24	DCOM	Power supply return (common)
25	DCOM	Power supply return (common)
26	P5	Positive 5 V dc regulated power supply for digital circuitry
27 - 34	BA0 - BA7	Buffered, demultiplexed DCP address lines 0 through 7

Table 4. Connector 10PL,
I/O Between SLCC and LTB Board

Pin No.	Nomenclature	Description
1	P24	+24 V dc.
2 - 8	1I2 - 1I8	±24 V logic lines to the drive.
9 - 16	------	Not connected.
17	N24	-24 V dc.
18	1I1	±24 V logic line to the drive.
19 - 25	1O1 - 1O7	Relay control lines 0 through 6.
26	P24	+24 V dc.

Table 5. Connector ARCPL,
I/O Between SLCC Card and DLAN or ARCNET

Pin No.	Nomenclature	Description
1	TXA-	Transmitting and receiving signals, channel A.
2	TXA+	Transmitting and receiving signals, channel A.
3	TXB-	Transmitting and receiving signals, channel B.
4	TXB+	Transmitting and receiving signals, channel B.
5	P5	Power +5 V dc.
6	DCOM	Power digital common.
7	TXB	Transmitting signal selected by JP15 as isolated DLAN circuit or RS-422.
8	TXA	Receiving signal selected by JP15 as isolated DLAN circuit or RS-422.

Table 6. Connector KPPL,
I/O Between SLCC Card LCP (U1) and Keypad

Pin No.	Connection
1	U1 pin 19
2	U1 pin 20
3	U1 pin 21
4	U1 pin 22 (PWM1)
5	U1 pin 23 (PWM2)
6	U1 pin 30 (BREO)
7	U1 pin 31 (HLDA)
8	U1 pin 32 (HOLD)
9	U1 pin 33 (T2UD)
10	U1 pin 38 (T2CAP)

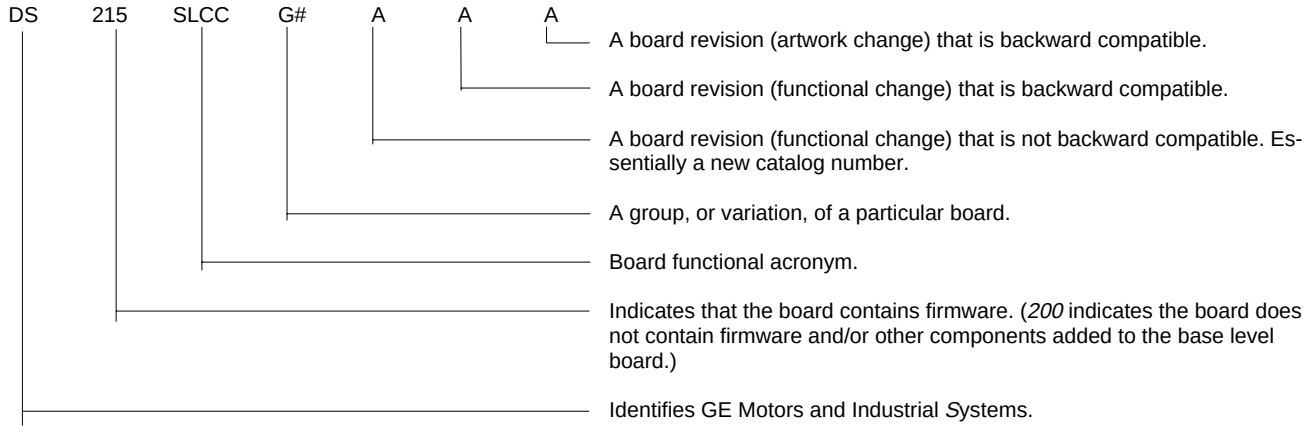

Figure 2. Sample Board Part Number, DS Series

RENEWAL/WARRANTY REPLACEMENT

BOARD IDENTIFICATION

A printed wiring board is identified by an alphanumeric part (catalog) number stamped on its edge. For example, the LAN Communications Card, with onboard software, is identified by part number DS215SLCCG#ruu. (See Figure 2 for part number breakdown.)

NOTE

All digits are important when ordering or replacing any board.

The DS215SLCC card includes onboard software stored in two EPROMs (U6 and U7) that contain configuration data programmed at the factory. These EPROMs are contained in sockets on the SLCC card.

When ordering replacement boards, note that the DS200SLCC card does not include the two EPROMs mentioned above (the sockets are empty).

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 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
- Equipment serial number and model number
- Board number and description

PROCEDURE FOR REPLACING BOARDS

WARNING

To prevent electric shock, turn off power to the drive, 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 or EPROMs, and always store boards in anti-static bags or boxes they were shipped in.

To replace an SLCC:

1. **Turn off the power to the drive**, then wait several minutes for all the 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. (The SLCC is mounted on the SDCC located in the drive’s board rack, facing the front.)

3. *If a programmer module is included*, remove the programmer by pulling the snaps (holders, located in each corner) outward to release the programmer cover and keypad, then pulling the programmer loose from the KPPL connector. (The keypad plugs into connector KPPL on the SLCC.)

4. Carefully disconnect all cables from the SLCC as follows:
   - Verify cables are labeled with the correct connector name (as marked on the card) 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.

5. Remove the SLCC from the SDCC by removing the four screws (with nylon washers) that secure it to the standoffs on the SDCC, then remove the SLCC.

CAUTION

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

6. Set all configurable items on the replacement (new) SLCC in the exact position as those on the card being replaced.

NOTE

When replacing an SLCC, if a board revision has added or eliminated a configurable component, or re-adjustment is needed, refer to Table 1.

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

CAUTION

Always use the nylon washers when inserting screws into the card to avoid damage to the card.

7. Install the new SLCC on the standoffs with the four screws (with nylon washers) removed in step 5.

8. Reconnect all cables to the SLCC as labeled. Ensure that cables are properly seated at both ends.

9. If a Programmer module is included, carefully plug the keypad into connector KPPL on the SLCC and snap the cover into place.

HARDWARE ADJUSTMENTS

Most of the jumper selections have been factory set. The test data sheets supplied with each controller (in the drive door pocket) indicate these positions. Table 1 lists and defines the jumpers.

Also in most applications, all wire jumpers are factory set to the correct position. Use these settings unless the instructions indicate otherwise. As described previously, ensure that the jumpers on the new card are placed the same as on the old card, unless the instructions indicate otherwise. Refer to Table 1, which lists the default setting first. Figure 1 shows jumper locations.

REPLACING/INSERTING SOFTWARE

The SLCC must include onboard software to function in the drive. This software is stored in the LCP EPROMs, U6 and U7. When replacing the SLCC, the onboard software must be transferred to the new card (if a DS200SLCC).

When replacing an SLCC, transfer the onboard software to the new card as follows:

1. Remove one of the two EPROM chips (U6 or U7) from the old card and insert it into the respective socket on the new SLCC.

CAUTION

To prevent damage to components, use the proper extraction/insertion tool when removing and inserting EPROMs.

To prevent damage to memory chips, ensure that chips are properly oriented when inserting them into sockets.

2. Repeat step 1 for the remaining EPROM.

3. If the failure symptoms that caused the card to be replaced still exist, install new EPROMs (shipped with the new card if a DS215SLCC).

Notes:

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