Application Note

Replacing An SA850/851 With An SA860

Shugart

APPLICATION NOTE FOR REPLACING A SHUGART SA850/851 WITH A SHUGART SA860

1.1 · INTRODUCTION

This application note provides the information required to replace a Shugart SA850/851 with a Shugart SA860. For a more detailed description of the SA860, refer to the SA810/860 OEM Manual (P/N 39216).

1.2 MOUNTING

The SA860 is exactly one half the height of the SA850/851. The width and mounting holes are the same as the SA850/851 with rack mount casting. Only the height of the side mounting holes is different due to the half-height packaging. A kit for strapping two drives together is available (P/N 51592).

1.3 AC/DC POWER REQUIREMENTS

The SA860 requires no ac power so the ac power connector may be discarded. DC power is supplied via a 5 pin AMP Mate-N-Lok connector P/N 1-350945-0 (J2). The recommended mating connector (P2) is AMP P/N 1-480763 utilizing AMP pins P/N 350689-1.

Since the SA850/851 uses a 6 pin AMP connector P/N 1-380999-0 (J5) connected to AMP P/N 1-480270-0 utilizing AMP pins P/N 61117-1 (P5), the SA850/851 dc plug is not directly compatible with the SA860. Because of this, a dc SA850/851 to SA810/860 dc plug adapter P/N 51438 must be used, or if preferred, the P5 connector may be replaced with the recommended P2 connector.

1.4 INTERFACE CONNECTIONS

The SA860 uses the same 50 pin cable as the SA850/851. All the interface lines used on the SA850/851 are also on the SA860. Additionally, the SA860 has an I/O line called TRUE READY which is not present on the SA850/851. This output signals that the drive is ready to handle data. This signal may be used in place of motor start and seek complete timers, but is not required. To replace an SA850/851 (jumpered as shipped from the factory) with an SA860, follow these steps:

a. If the step rate is 6 ms or slower, jumper trace designator PD. This will ensure quiet stepping.

b. Adjust the head load delay to 165 ms. Since the SA860 has no head load solenoid, starting the dc spindle motor performs the complementary function. This timing delay (measured from the leading edge of DRIVE SELECT to the beginning of valid read/write data) is performed by the controller and may be software or hardware controlled. Another method of measuring this delay is to monitor the TRUE READY line (pin 8). When TRUE READY is active low, read/write activity may begin.

c. Remove terminator pack at location U9 on all drives except for the last drive on the daisy chain.

d. All other jumpers are positioned as shipped from the factory.

See table 1-1 for a comparison of SA850/851 and SA860 interface connections.

If the SA850/851 being replaced has been jumpered differently than the standard factory configuration, see table 1-2. This table can be used as a quick cross reference between the trace designators on the SA850/851 and the trace designators on the SA860.

For example, if the jumper configuration for your system calls for trace designator C to be jumpered, table 1-2 indicates that trace designator MO must be plugged on the SA860 PCB.

TABLE 1-1. SA850/851 VERSUS SA860 INTERFACE CONNECTIONS

PIN	SA850/851	SA860
2	EXTERNAL WRITE CURRENT SWITCH	EXTERNAL WRITE CURRENT SWITCHING*
4	ALTERNATE I/O	ALTERNATE I/O
6	ALTERNATE I/O	ALTERNATE I/O
8	ALTERNATE I/O	TRUE READY
10	TWO SIDED STATUS	TWO SIDED STATUS*
12	DISK CHANGE	DISK CHANGE*
14	SIDE SELECT	SIDE SELECT
16	IN USE	IN USE*
18	HEAD LOAD	MOTOR ON*
20	INDEX	INDEX
22	READY	READY
24	SECTOR	SECTOR
26	DRIVE SELECT 1	DRIVE SELECT 1
28	DRIVE SELECT 2	DRIVE SELECT 2
30	DRIVE SELECT 3	DRIVE SELECT 3
32	DRIVE SELECT 4	DRIVE SELECT 4
34	DIRECTION SELECT	DIRECTION SELECT
36	STEP	STEP
38	WRITE DATA	WRITE DATA
40	WRITE GATE	WRITE GATE
42	TRACK 00	TRACK 00
44	WRITE PROTECT	WRITE PROTECT
46	READ DATA	READ DATA
48	SEPARATED DATA	SEPARATED DATA
50	SEPARATED CLOCK	SEPARATED CLOCK

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*Jumper enabled alternate I/O lines.

TABLE 1-2. CUSTOMER CUT/ADD TRACE OPTIONS

DESCRIPTION	SA850/851			SA860		
	TRACE DESIGNATOR	SHIPPED FROM FACTORY		TRACE DESIGNATOR	SHIPPED FROM FACTORY	
		OPEN	SHORT		OPEN	SHORT
TERMINATION FOR MULTIPLEXED STANDARD INPUTS	5E		Plugged	U9		Plugged
DRIVE SELECT 1 INPUT PIN	DS1		Plugged	DS1		Plugged
DRIVE SELECT 2, 3, 4 INPUT PINS	DS 2, 3, 4	X		DS 2, 3, 4	X	
SIDE SELECT OPTION USING DRIVE SELECT	1B, 2B 3B, 4B	X		1B, 2B 3B, 4B	X	
RADIAL READY	RR		X	RR		X
RADIAL INDEX AND SECTOR	RI		X	N/A		
OPTION SHUNT FOR READY OUTPUT	R		X	R		X
TWO SIDED STATUS OUTPUT	2S	X		2S	X	
SECTOR OPTION ENABLE	850/851	850	851	NOTE 1		
INDEX OUTPUT PAD	I		X	N/A		
SECTOR OUTPUT PAD	S		X	N/A		
DISK CHANGE OPTION	DC	X		DC	X	
STEPPER POWER FROM HEAD LOAD	HL		X	NOTE 2		
STEPPER POWER FROM DRIVE SELECT	DS	X		NOTE 2		
INHIBIT WRITE WHEN WRITE PROTECTED	WP		X	WP		X
ALLOW WRITE WHEN WRITE PROTECTED	NP	X		NP	X	
ALTERNATE INPUT - IN USE	D	X		D	X	
MULTI-MEDIA OPTION	M		Plugged	NOTE 3		
DOOR LOCK LATCH OPTION	DL		X	NOTE 4		
RADIAL HEAD LOAD	A, B, X		X	MS*		Plugged
ALTERNATE INPUT - HEAD LOAD	C	X		MO*	X	
ALTERNATE INPUT - MULTIPLEXED HEAD LOAD		(X)	(A,B,C)	MMO*	X	
IN USE FROM DRIVE SELECT	Z		X	Z		Plugged
IN USE FROM HEAD LOAD	Y	X		Y	X	
SIDE SELECT OPTION USING DIRECTION SELECT	S1	X		S1	X	
STANDARD SIDE SELECT INPUT	S2		X	S2		Plugged
SIDE SELECT OPTION USING DRIVE SELECT	S3	X		S3	X	
DATA SEPARATION OPTION SELECT	TS, FS	TS	FS Plugged	TS	X	
WRITE CURRENT SWITCH (EXTERNAL)	IW		Plugged	SE	X	
READY STANDARD	RS		Plugged	NOTE 4		
READY MODIFIED	RM	X		N/A		
HEAD LOAD LATCH	HLL	X		N/A		
IN USE TERMINATOR	IT		Plugged	U9		Plugged

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TABLE 1-2. CUSTOMER CUT/ADD TRACE OPTIONS (Continued)

DESCRIPTION	SA850/851			SA860		
	TRACE DESIGNATOR	SHIPPED FROM FACTORY		TRACE DESIGNATOR	SHIPPED FROM FACTORY	
		OPEN	SHORT		OPEN	SHORT
HEAD LOAD OR IN USE TO THE IN USE CIRCUIT	HI	X		N/A		
REMOVE FOR MFM ENCODING INSTALL FOR MFM	F	X		NOTE 3		
INSTALL FOR FM OR MFM ENCODING	AF		Plugged	NOTE 3		
INSTALL FOR M²FM ENCODING	NF	X		NOTE 3		
INTERNAL WRITE CURRENT SWITCH	N/A			SI		Plugged
TRUE READY OUTPUT	N/A			TR		Plugged
RADIAL TRUE READY	N/A			RTR		X
MOTOR OFF DELAY	N/A			MD	X	
STEPPER POWER DOWN	N/A			PD	X	
STANDARD READY	N/A			SR		Plugged
MODIFIED TRUE READY	N/A			MT	X	

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*MOTOR ON is the compliment of HEAD LOAD on the SA850/851 disk drives. The only difference in the operation of MOTOR ON compared with HEAD LOAD is that MOTOR ON requires a 165 ms minimum delay before read/write activity is begun. HEAD LOAD on the SA850/851 requires a 50 ms minimum delay.

NOTES

1. The SA860 automatically adjusts depending on whether hard or soft sectored diskettes are being used.

2. The operation of the SA860 is automatically identical to that of the SA850/851. The stepper motor is enabled whenever the drive is selected or the dc spindle motor is up to speed or anytime a step pulse has been received.

3. The SA860 does not require jumpers for specific media or encoding types. It will operate with all approved media and specified encoding methods.

4. The operation of the SA860 is automatically identical to that of the SA850/851 with this jumper installed.

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