

Model 3830-Z1A

List Sequencer

INSTRUCTION MANUAL

March, 1987

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Lockport, Illinois
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**** Special Option ****

Model 3830-S001

List Sequencer

August 1986

Model 3830-S001

**** Special Option ****

Model 3830-S001

List Sequencer

The Model 3830-S001 is the same as a Model 3830-Z1A but it has been arranged for more than 4 NAF lists by eliminating the automatic memory pointer re-set.

August 1986

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List Sequencer

Adds I/O list capability to the Model 3952 Serial Crate Controller

3830

Features

- Interfaces to 3952 Enhanced Serial Crate Controller
- Provides four programmable NAF lists
- Capacity is 512 16-bit words per list
- Q-Repeat mode for lists containing Read commands
- Interfaces to the Dataway P1 and P2 lines
- Contains a 24-bit LAM mask register

Typical Applications

- High-speed data acquisition
- Mixed-NAF block transfers

General Description

The 3830 is a single-width CAMAC module that adds NAF list mode capability to the Models 3952-ZIE/ZIF Enhanced Serial Crate Controller (SCC). The 3830 also contains a 24-bit LAM mask register for the BTSCC. Additionally, this module provides a clock IN/OUT connection between two front-panel connectors and the P1 patch line on the Dataway for special module timing information.

When the SCC is driven from a block-mode Serial Highway driver, such as the Model 2160 or 2190, speed performance is greatly enhanced by allowing multiple Dataway cycles within a single serial message. The 3830 adds multi-NAF capability to these block messages. It contains a 2K x 16 RAM memory that is writable from the Dataway and can contain up to four NAF (slot, subaddress, function code) lists. An optional EPROM memory can be provided for nonvolatile storage of the NAF lists.

During operation, the SCC supplies the Dataway cycle strobes and interfaces with the Write or Read data. It supplies control sequences to the 3830 via a front-panel ribbon cable. The 3830 drives the Dataway A and F lines and transmits the binary N information to the SCC via the rear Auxiliary Controller Bus cable.

The next NAF word is normally fetched after each Dataway cycle is executed except for the following cases:

1. An end-of-list word (Bit 16 = 1) is reached. Incrementing is stopped, and a unique Q = 1, X = 0 (terminate block transfer) response is sent.
2. The 3830 has Q Repeat mode enabled and a Q = 0 response is found. The NAF is repeated until Q = 1 is encountered; the next NAF is then fetched.

NAF Lists [written by F(16)·A(0)]

LIST	TYPE	MAXIMUM LENGTH (Note 1)
0	Read	511 words + end-of-list word
1	Read	511 words + end-of-list word
2	Write	511 words + end-of-list word
3	Write	511 words + end-of-list word

Notes: 1. If only 0 and List 2 are used, they can contain up to 1023 words each.
2. CAMAC Control Commands [F(24), etc.] can be mixed in the Read or Write lists as long as they are treated as data transfers (with data ignored) at the host.

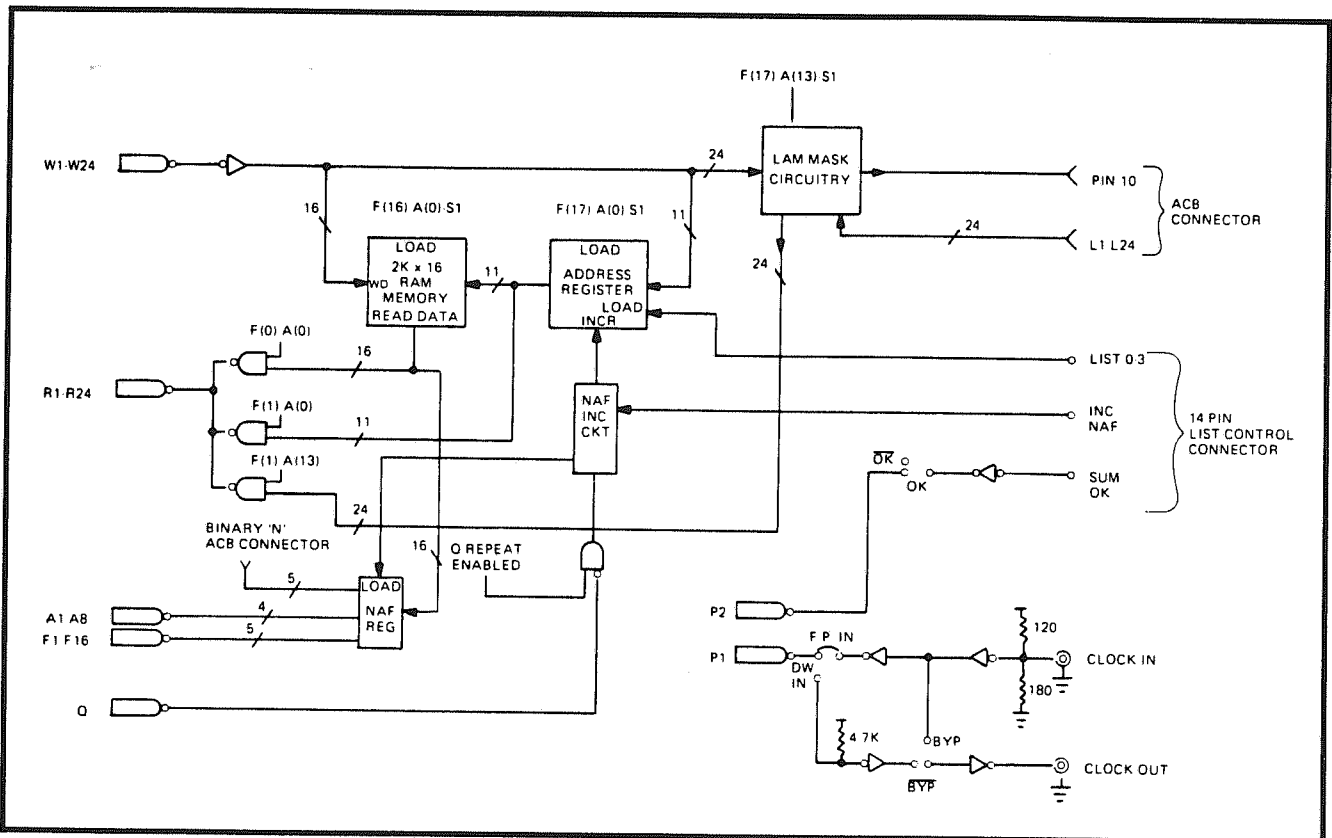


Function Codes

Command	Q	Action
F(0)·A(0) RD1	ENA	Reads the memory word at the current memory address, then increments the address.
F(1)·A(0) RD2	1	Reads the Memory Address register.
F(1)·A(13) RD2	1	Reads the LAM Mask register.
F(16)·A(0) WT1	1	Writes the memory word at the current memory address, then increments the address.
F(17)·A(0) WT2	1	Writes the Memory Address register.
F(17)·A(13) WT2	1	Writes the LAM Mask register.
F(24)·A(0) DIS	1	Disables Q-Repeat mode.
F(26)·A(0) ENB	1	Enables Q-Repeat mode.
Z CZ	0	Clears LAM Mask register, Address register and list enable, and disables Q-Repeat mode.

Notes: 1. X = 1 for all valid addressed commands when no block transfer is in progress.
 2. Q = X = 0 for all addressed commands when block transfer is in progress.
 3. ENA = 1 (List enable) when at least one end-of-list word has been written into memory by F(16)·A(0).

Simplified Block Diagram



Power Requirements

+6 volts: 1250 mA

Ordering Information

Model 3830-Z1A List Sequencer for the 3952 Enhanced Serial Crate Controller

Related Products

Model 2010-Z1A SGL Adapter
 Model 5843-A000 Ribbon Cable
 Model 5860-M000 3830/3952 List Control Cable
 Models 2160 and 2190 Serial Highway Drivers
 Model 3952-Z1G/-Z1H Enhanced Serial Crate Controller with Block Modes

FRONT PANEL DESCRIPTION

LEDS

- N Flashes whenever 3830 is addressed from Dataway.
- List Enable Latched "ON" after an End-of-List word has been written into memory.
- List Active Lit whenever List Enable is true and when the crate controller has set one of the four list lines.

CONNECTORS

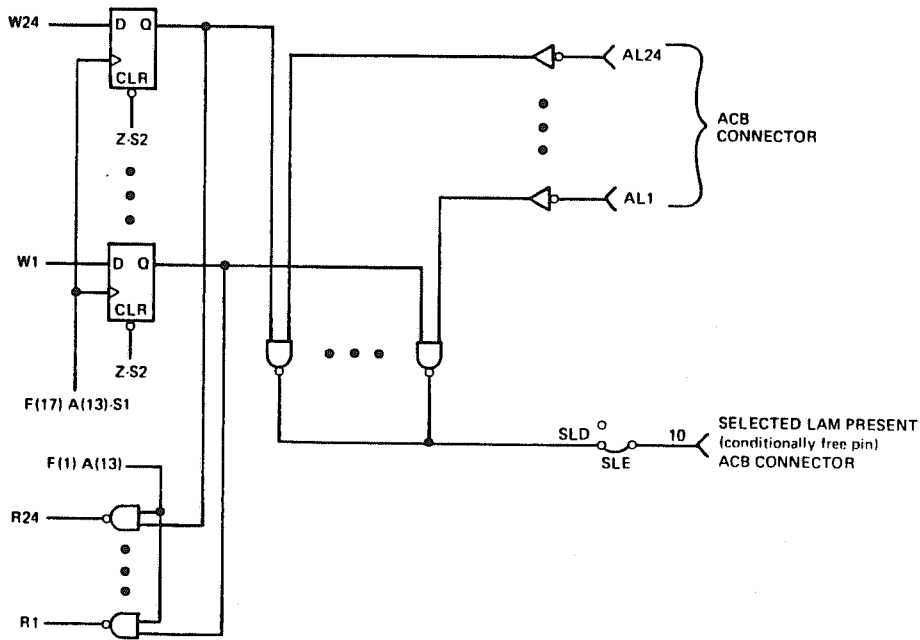
- Clock-In LEMO Single-pin LEMO connector terminated in 75 ohms. This TTL signal is passed through to Dataway P1 line and/or to Clock-Out LEMO if enabled.
- Clock-Out LEMO Single-pin LEMO with TTL output signal. The output is driven either by Dataway P1 line or Front-panel Clock-In LEMO.
- List Control 14 pin connector to be connected to Auxiliary connector on crate controller.

PIN NO.	ACTION
1-4	Not Used
5,6	Ground
7,8	Not Used
9	Increment NAF (H)
10	Sum OK (L)
11	List 3 (H)
12	List 2 (H)
13	List 1 (H)
14	List 0 (H)

NOTE: (H) = High True TTL
(L) = Low True TTL

LAM MASK REGISTER

A writeable and readable 24-bit LAM mask register is provided. An F(17)A(13) command will mask "on" the desired bits and a F(1)A(13) command will read back the value of this LAM mask register. A crate initialization will set all of the bits in the LAM mask register "off". With a LAM mask bit "on" (true) and a LAM is set corresponding to that LAM mask bit the Selected LAM Present Signal will be set true.



LAM MASK CIRCUITRY

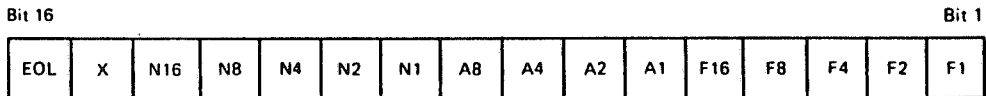
MEMORY DESCRIPTION

The Model 3830's 2K X 16 memory stores the NAF's to be used during Block Transfer operation. Up to four different lists of NAF's can be written into the memory. The first two lists are dedicated to CAMAC read commands and the last two lists to CAMAC write commands. Control commands can be entered into any of the lists.

The 16 bit memory word is divided as follows:

- Bits 1-5 5 Bit Binary representation of function code.
- Bits 6-9 4 Bit Binary representation of subaddress
- Bits 10-14 5 Bit Binary representation of crate slot address.
- Bit 15 Don't care.
- Bit 16 End-of-List flag.

The End-of-List flag must be set in the memory word following the last NAF to be accessed in the list. Upon power-up or after a crate initialize (CAMAC Z command) at least one End-of-List word must be written to the 3830. Writing an End-of-List word enables the 3830 to operate in Block Transfer mode. When the RAM I.C.'s are replaced with Eproms it is not necessary to enable the 3830 for Block Transfers by writing the End-of-List word. The module will be continuously enabled when the Eprom straps are loaded.



Memory word bit assignment

Each list can contain up to 512 words (511 NAF's and one end-of-list word). If it is necessary to have more than 512 words List 0 and List 1 can be combined, and also List 2 and 3. In this case List 0 and List 2 would have the same starting address but will extend their range into List 1 and List 3, respectively.

NAF LIST	DATA TYPE	STARTING ADDRESS	MAXIMUM LENGTH
List 0	CAMAC Read	0	512 (1024) words
List 1	CAMAC Read	512	512 words
List 2	CAMAC Write	1024	512 (1024) words
List 3	CAMAC Write	1536	512 words

NOTE: IF only List 0 and List 2 are used, then they shall have a maximum length of 1024 words.

When all four lists are being used they can each contain up to 512 words (511 NAF's and one End-of-List word). The actual length of each list will depend upon how many NAF's need to be executed. For example, if only 10 commands are necessary in List 0 the total length would be 11 words (10 NAF words and an End-of-List word). List 1 will always have a starting memory address of 512 unless the user desires to have List 0 longer than 511 words. In this situation, List 0 greater than 511 words, list 1 will not be used. Just like List 0 and List 1, List 2 can be extended into the memory addresses initially designated for List 3. The Read Lists, List 0 and 1, should never be extended into List 2.

During Block Transfers the list to be used is automatically selected by the BTCC by asserting one of the four list lines. These list lines enter the 3830 via the front-panel 14-pin connector.

EPROM MEMORY

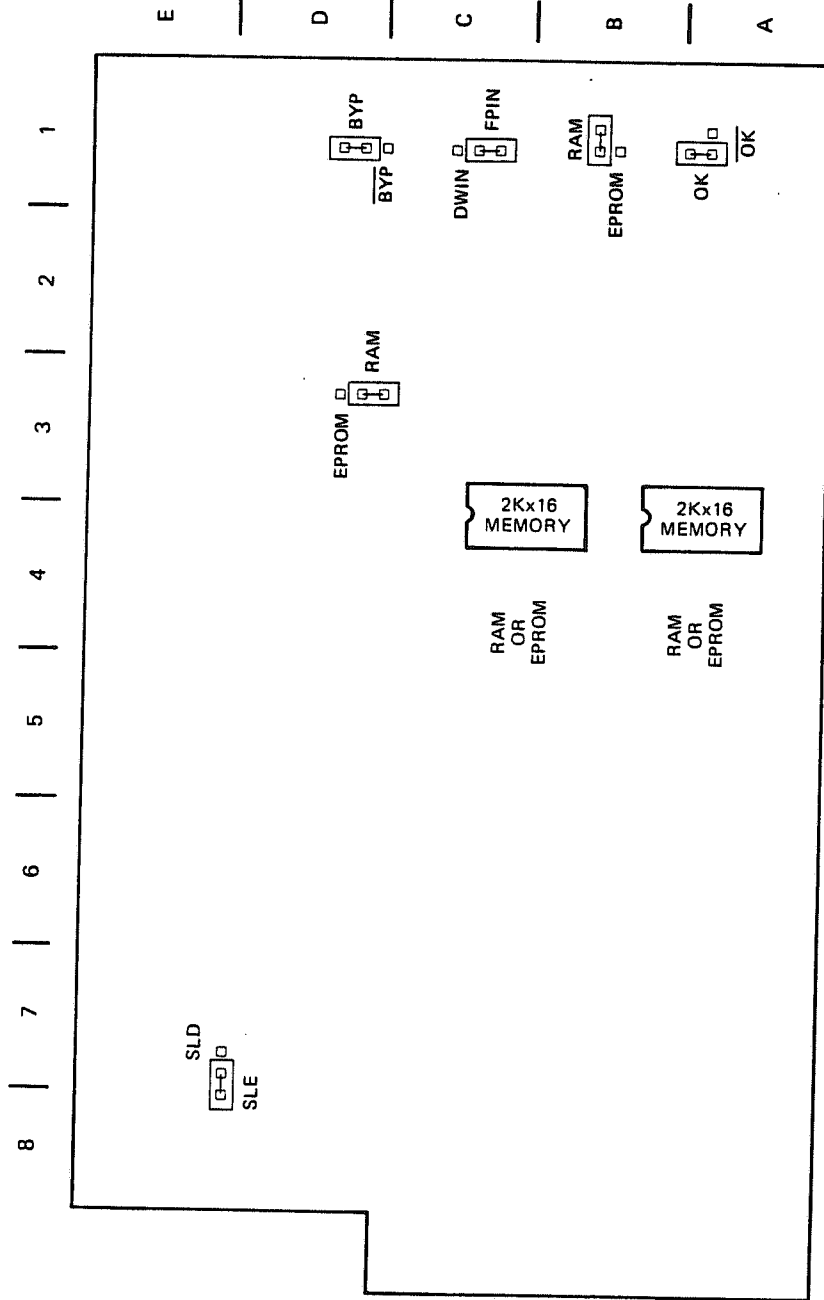
By replacing the two 2K x 8 RAMSs with two pre-programmed Intel type 2716 Eproms the user will not have to rewrite the memory every time the crate is powered-up or when a crate initialization (2 command) is performed. Of course the Eproms must be reprogrammed every time a change to a NAF List is made.

The user should make certain that the 3830 is strapped correctly for Eprom usage. Refer to Strap Descriptions on page 7 for strap locations and definitions.

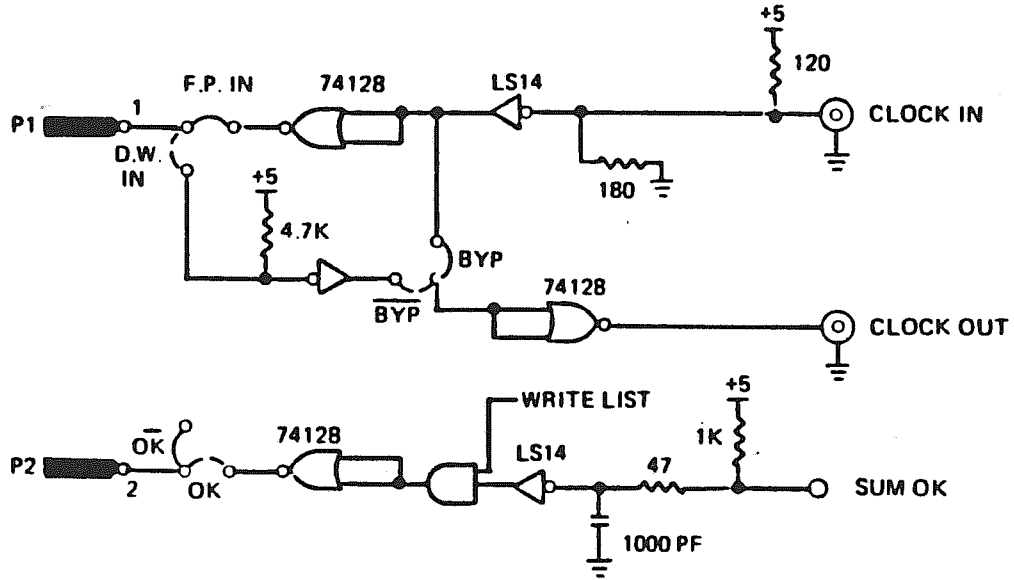
Strap Descriptions

Strap	Location	Action
RAM/EPROM	B1	With the strap inserted for RAM the List Enable will not go true until at least one End-of-List word has been written with an F(16)A(0). With the strap inserted for Eprom List Enable will always be true.
RAM/Eprom	D3	Insert RAM strap when Toshiba 2016 type RAM chips are used. Insert Eprom strap when Intel 2716 type Eproms are used.
SLE/SLD	E7	Selected LAM present signal, the result of a LAM and a valid mask bit both being true, is enabled by SLE and disabled by SLD.
BYP/ $\overline{\text{BYP}}$	D1	When the BYP strap is inserted the Clock-In signal is retransmitted out of the Clock-Out LEMO. $\overline{\text{BYP}}$ will allow the Dataway P1 line to drive the Clock-Out LEMO.
DWIN/FPIN	C1	When the DWIN strap is inserted the Dataway P1 line will be patched to drive the Clock-In LEMO. The user should note that the BYP strap must also be inserted. When FPIN strap is loaded the Clock-In signal will drive the Dataway P1 line.
OK/ $\overline{\text{OK}}$	A1	When OK strap is inserted the Sum OK signal will drive the Dataway P2 line. $\overline{\text{OK}}$ will inhibit the Sum OK signal from driving the P2 line.

NOTE: See following page for location of straps on 3830



3830 LOCATION DIAGRAM



AUXILIARY CONTROL CIRCUITRY

OPERATING NOTES

Before using the 3830 the following steps must be taken to allow correct operation:

1. Strap the 3830 for appropriate use. Refer to page 7 for Strap Descriptions.
2. Wire the Model 2010 SGL Adapter. Refer to the 2010 operating manual for details.
3. Insert module and attach connectors at both the front and rear of the module.
 - a) ACB connection on 3830 to 2010 which is connected to BTCC.
 - b) List control connector on 3830 to Auxiliary connector on BTCC.
 - c) Clock-In and Clock-Out to necessary modules (as needed).

When using the 3830 it is necessary that at least one End-of-List word is written to the RAM memory, after a crate initialization, to set List Enable. If this is not done the 3830 will not operate in Block Transfer mode. If Eproms are used instead of RAM chips then it is not necessary to write the End-of-List word. The 3830 should have the List Enable strapped always true when Eproms are used.

Rear Panel Auxiliary Controller Bus Connector

As specified by IEEE Standard 675-1982, "Multiple controllers in a CAMAC crate", this 40 pin connector contains the encoded Binary N lines, the Auxiliary LAM lines, the Auxiliary Controller Lockout (ACL) signal, and the selected LAM Present signal.

During Block Transfer operations the 3830 will control the encoded N lines. The crate controller will then decode the binary N signal and drive the appropriate N line.

The auxiliary LAM lines are the LAM signals of the crate retransmitted out by the crate controller to the 3830.

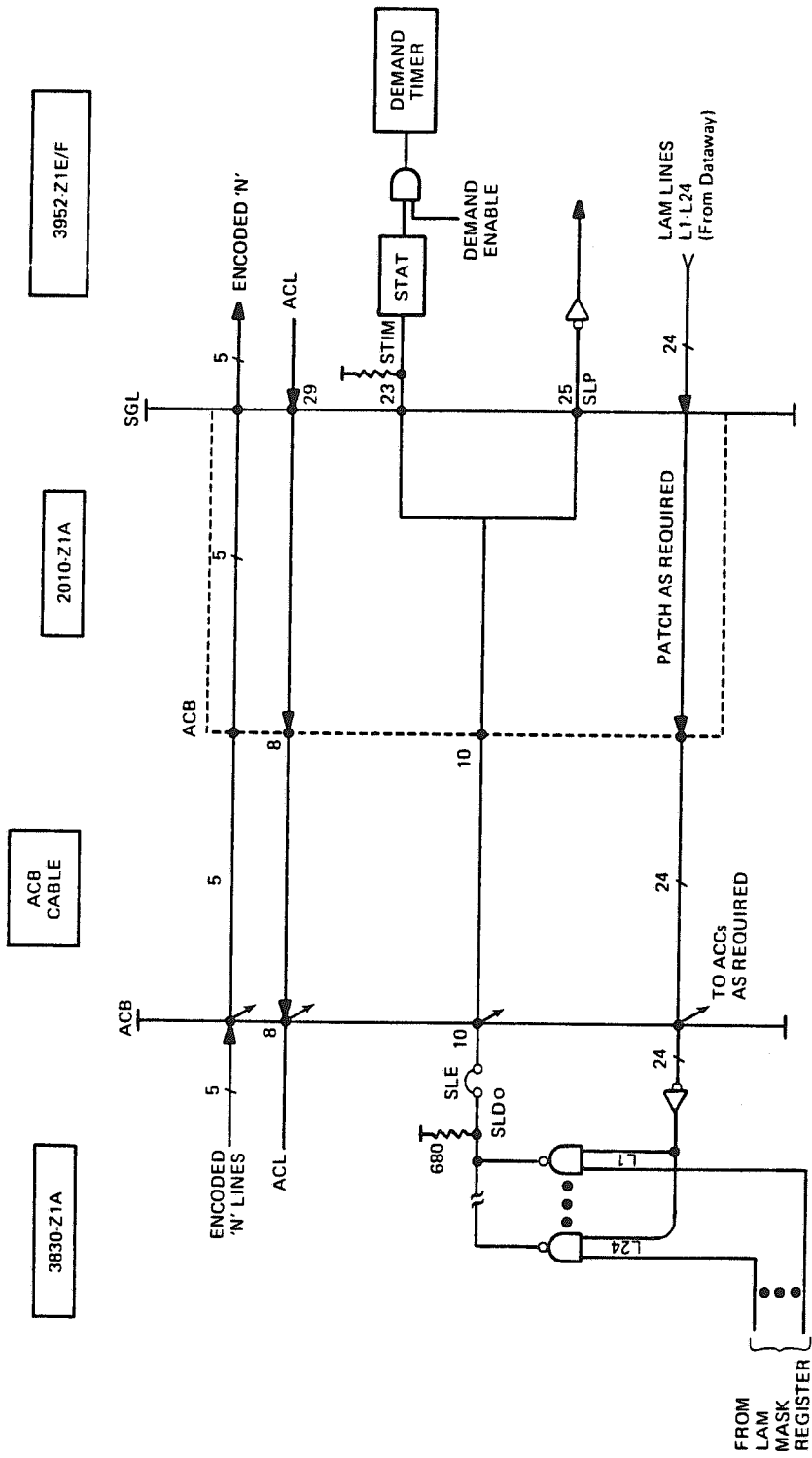
The crate controller generates the ACL signal whenever it is performing a Dataway cycle or when doing a Block Transfer with the 3830. The signal must be true for the 3830 to sequence through the list.

The Selected LAM Present (SLP) signal is transmitted over the conditionally free pin of the ACB. This signal can be disabled by a strap. A true signal is received only when both a masked LAM bit and an Auxiliary LAM signal are true.

Below is a table showing all the contact assignments of the Auxiliary Controller Bus that are used by the 3830.

<u>Contact</u>	<u>Usage</u>	<u>Contact</u>	<u>Usage</u>
1	GND	2	Encoded-N EN1
3	Encoded-N EN2	4	Encoded-N EN4
5	Encoded-N EN8	6	Encoded-N EN16
7	GND	8	ACL
9	GND	10	Conditionally Free (SLP)
11	GND	12	N/U
13	GND	14	N/U
15	GND	16	AL1
17	AL2	18	AL3
19	AL4	20	AL4
21	AL6	22	AL5
23	AL8	24	AL9
25	AL10	26	AL11
27	AL12	28	AL13
29	AL14	30	AL15
31	AL16	32	AL17
33	AL18	34	AL19
35	AL20	36	AL21
37	AL22	38	AL23
39	AL24	40	GND

N/U = Not Used



3830 ACB to 3952 SGL CONNECTIONS

WARRANTY

KineticSystems Company, LLC warrants its standard hardware products to be free of defects in workmanship and materials for a period of one year from the date of shipment to the original end user. Software products manufactured by KineticSystems are warranted to conform to the Software Product Description (SPD) applicable at the time of purchase for a period of ninety days from the date of shipment to the original end user. Products purchased for resale by KineticSystems carry the original equipment manufacturer's warranty.

KineticSystems will, at its option, either repair or replace products that prove to be defective in materials or workmanship during the warranty period.

Transportation charges for shipping products to KineticSystems shall be prepaid by the purchaser, while charges for returning the repaired warranty product to the purchaser, if located in the United States, shall be paid by KineticSystems. Return shipment will be made by UPS, where available, unless the purchaser requests a premium method of shipment at their expense. The selected carrier shall not be construed to be the agent of KineticSystems, nor will KineticSystems assume any liability in connection with the services provided by the carrier.

The product warranty may vary outside the United States and does not include shipping, customs clearance, or any other charges. Consult your local authorized representative or reseller for more information regarding specific warranty coverage and shipping details.

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1. Contact KineticSystems and discuss the problem with a Technical Service Engineer.
2. Obtain a Return Authorization (RA) Number.
3. Initiate a purchase order for the estimated repair charge if the product is out of warranty.
4. Include a description of the problem and your technical contact person with the product.
5. Ship the product prepaid with the RA Number marked on the outside of the package to:

KineticSystems Company, LLC
Repair Service Center
900 North State Street
Lockport, IL 60441

Telephone: (815) 838-0005
Facsimile: (815) 838-4424
Email: tech-serv@kscorp.com