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TITLE

73/620 52XX DATA COMMUNICATIONS MULTIPLEXOR TEST PROGRAM

OVERVIEW/EXTERNAL/INTERNAL

Software Performance Specification

CODE IDENT NO.	SIZE	DWG NO	REV
21101	A	89A0256	A

SCALE

This document contains 200 pages.

96A0153-0008

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SECTION 1
SYSTEM OVERVIEW

1.1 BACKGROUND AND GOALS

The Data Communications Multiplexer (DCM) test program provides for the testing and exercising of the DCM. The program provides for the logging of error or malfunction messages, error loops and halts. The program consists of several specialized tests, these tests can be requested by the operator of the program. Each test is designed to check the operation of a specific part of the DCM. This modularizing of the test program allows for testing specific parts of the DCM for fault isolation and for ease in adding new tests. The test program will operate with the Maintain II test executive and will make use of the I/O and sense switch routines contained therein.

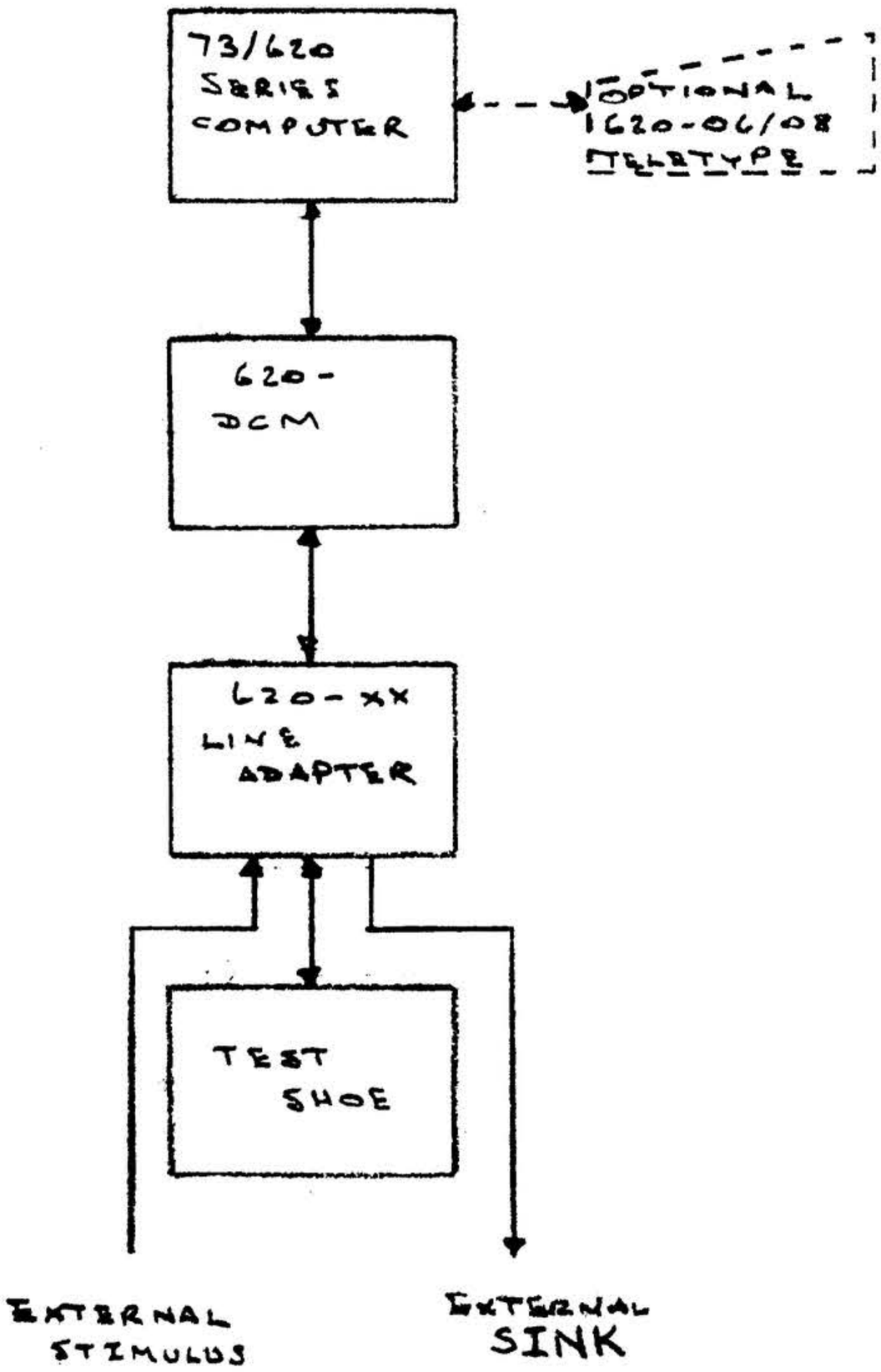
1.2 HARDWARE DESIGN SUMMARY

The DCM test program requires a 73/620 computer with at least 8K of memory, a data communications multiplexer, one or more of the following line adapter modules: 5302 A1 line adapter, 5303 A2A line adapter, 5304 A2B line adapter, 5301 A3 line adapter, or 5305 B line adapter. Optionally through Maintain II the test will support a 620-06/08 teletype.

8K minimum memory size was chosen for two reasons. 1) Maintain II resides at the top of the first 4K. To retain it the LCB must not be higher than 03700, and 2) with 8K, enough memory is available for all tests to reside, that way the program will have no overlays to confuse the operator.

1.3 SOFTWARE DESIGN SUMMARY

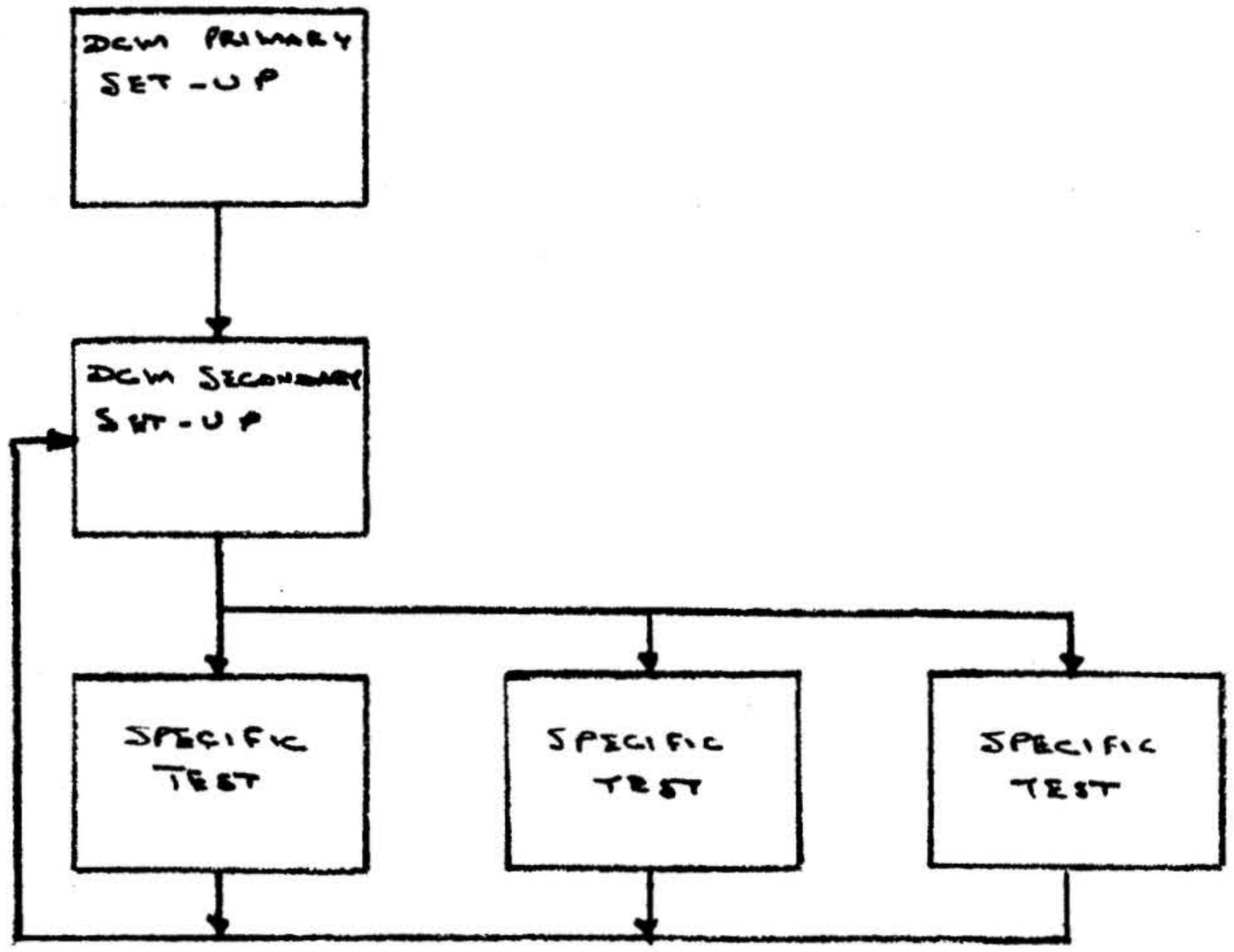
The 620 DCM test program is designed to operate with the Maintain II test executive (Manual Number 98A 9952 060) and uses the teletype interface, sense switch routines, and system constants contained therein. The 620 DCM test program consists of a parameter set-up component and specific tests. The parameter set-up component requests and accepts various values to configure the software to the hardware. The specific test is performed as requested with errors and malfunctions optionally reported to the user.



GENERAL HARDWARE
CONFIGURATION

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SECTION 2
EXTERNAL SPECIFICATION

2.1 INTRODUCTION

The external specification provides all the operating procedures and information pertinent to user interface. The DCM test is normally loaded and executed via teletype keyboard commands from the user. The Maintain II Executive program is the software interface for accomplishing these functions.

2.2 LOADING PROCEDURE

The Maintain II Executive must be loaded before the DCM test program will operate correctly. Standarized subroutines, including the teletype I/O routines, are resident in the test executive and are called by the associated test program.

Load the Test Executive Tape, which includes the binary object tape loader, per the procedure outlined in the Test Executive External Specification (89A0122).

Position the DCM test tape in the reader anywhere on the blank leader.

Press key L on the keyboard, followed by a period, to command the Test Executive to load the tape. Refer to the Test Executive external specification (89A0122) for details on loading test programs.

2.3 OPERATING INSTRUCTIONS

2.3.1 Teletype Mode

NOTE: Upper case letters indicate output to the teletype, lower case letters indicate the operator response.

2.3.1.1 Primary Set-up

NOTE: Setting sense switch 3 at any time during the primary set-up will cause the program to give control to the Maintain II Executive.

After loading, the DCM test the program will type out the following messages:

DCM TEST

This message is for information only and requires no operator action.

LCB ADDRESS = addr.

The operator responds with the octal address of the line control block followed by a period. Tests are made on this value to insure that the LCB does not overlay any program area. Should the LCB overlay the program, its value is rejected. The message INVALID is typed and the LCB address is again requested.

DCM ADDRESS = addr.

The operator responds with the octal device address of the DCM followed by a period. Range checks insure this value is within the range 0 to 77_8.

INTERRUPT ORIGIN = addr.

The operator responds with the octal address of the DCM followed by a period. Range checks insure this value to be modulo 16 and to be within the range 0 to 760_8.

2.3.1.2 Secondary Set-up

NOTE: Setting sense switch 3 at any time during the secondary set-up will cause the program to give control to the primary set-up.

LINE ADAPTER TYPE = type.

The operator responds with the numeric type of line adapter, followed by a period. Acceptable inputs are: 1. Asynchronous Data Set, 2. Asynchronous Direct Connect, or 4. Synchronous.

TERMINATE TEST = value.

The operator responds with a 0. for continuous operation or a 1. to terminate the test after one pass.

DATA PATTERN = value .data .

The operator responds with an octal value corresponding followed by a period to the data pattern requested to be output. Acceptable values and their meaning are: 0 = all zeros, 1 = all ones, 2 = ascending binary, 3 = alternating ones/zeros, 4 = fixed data (NOTE: The fixed data pattern, an octal word defining the left and right byte, follows the period and is itself followed by a period.).

ACTIVE LINES = firstline, lastline.

The operator responds with two octal numbers separated with a comma and terminated with a period, first and last lines (inclusive) to be used during the test.

BIT LENGTH = number.

The operator responds with the octal number of the line adapter bit length. Acceptable inputs are 5, 6, 7, or 10.

TEST = number

The operator responds with the number of the test he wishes executed followed by a period. Acceptable numbers and their meaning:

0 = Transmit only	(all adapters)
1 = Loop Test	(all adapters)
2 = Control Character Test	(all adapters)
3 = Speed Select Test	(type 1 and 2 adapters)
4 = Break Test	(type 1 and 2 adapters)
5 = Interrupt Test	(all adapters)
6 = Status Flag Test	(type 1 and 4 adapters)
7 = Large Block Transfer	(type 1 and 2 adapters)
10 = Echo Mode Test	(type 1 and 2 adapters)
11 = Synchronization Test	(type 4 adapter)
12 = Resync Test	(type 4 adapter)
13 = Transmit Sync Test	(type 4 adapter)
14 = Auto Parity Test	(type 4 adapter)
15 = Inhibit Output Test	(type 4 adapter)
16 = No Sync Test	(type 4 adapter)
17 = VDM ASCII	(all adapters)
77 = Burn-in Test	(all adapters)*

*Test 77 cycles through all applicable tests except 0, 7, and 10.

Should the bit length be 7 or less, the following message is typed:

MIRROR IMAGE = n.

Acceptable values are 0 for no or 1 for yes.

NOTE: Without mirror image data is right justified, with mirror image data is left justified.

2.3.2 Console Mode

NOTE: Refer to section 2.1.2 for values.

2.3.2.1 Primary Set-up

NOTE: Setting sense switch 3 at any time during the primary set-up will cause the program to give control to the Maintain II Executive as soon as the program is able to.

Halt	Register Setting
01	A = LCB Address B = DCM Address X = Interrupt Origin

2.3.2.2 Secondary Set-up

NOTE: Setting sense switch 3 at any time during the secondary set-up will cause the program to give control to the primary set-up as soon as the program is able to.

Halt	Register Setting
02	A = Line Adapter Type B = Pattern Type X = Fixed Pattern (if used)
03	B = First Active Line X = Last Active Line A = Terminate Test

Halt	Register Setting
04	A = Test Number B = Bit Length 37 = 5 bit 77 = 6 bit 177 = 7 bit 377 = 8 bit X = Mirror Image

2.3.3 Sense Switch Settings During Tests

The following sense switch options are available through the Maintain II Test Executive to the operator:

Switch	Set	Reset
SS1	Suppress error printout if no TTY suppress error halt.	Print error messages if no TTY - halt.
SS2 (after halt)	Halt on error Continue	Do not halt on error loop after error halt.
SS3	Terminate test.	Continue test.

2.4 TEST DESCRIPTIONS

2.4.1 Test 0 Transmit

Each of the active lines is placed in the transmit mode and allowed to run continuously using the selected data pattern.

2.4.2 Test 1 (Loop)

Each of the active lines is placed in the full duplex (transmit/receive) mode and allowed to run continuously using the selected data pattern. Any errors or malfunctions will be reported to the operator, and the test will continue (if so configured).

2.4.3 Test 2 (Control Character)

Each of the active lines is placed in the full duplex (transmit/receive) mode, one at a time using the binary data pattern, 255 control characters (0 is not checked) are checked one at a time. When the line has been tested, the next active line is tested. The program will run continuously until manually halted. If a control character is not detected, this fact is reported to the operator, and the test will continue (if so configured).

2.4.4 Test 3 (Speed Select)

Each of the active lines is placed in the full duplex (transmit/receive) mode and allowed to run continuously using the selected data pattern. As each line completes a block, its speed is changed. Errors or malfunctions are reported as in test 1.

2.4.5 Test 4 (Break)

Each of the active lines is placed in the full duplex (transmit/receive) mode and allowed to run continuously using the selected data pattern. One by one the active lines are forced to transmit breaks, the receive detects these and reports to the program. Any errors or malfunctions are reported as in test 1.

2.4.6 Test 5 (Interrupt)

Each of the active lines is tested for correct interrupt response (control line in and out, output buffer and output register empty, and ring indicator). The program will run continuously until manually halted. Errors or malfunctions are reported as in test 1.

2.4.7 Test 6 (Status Flag)

Each of the active lines is tested for correct status flag setting. The program will run continuously until manually halted. Errors or malfunctions are reported as in test 1.

2.4.8 Test 7 (Large Block Transfer)

Each of the active lines is placed in the full duplex (transmit/receive) mode and allowed to transmit a large block of random data (4096 bytes). The receive side receives smaller blocks (256 bytes) and checks the first word for correctness. The test will run continuously until manually halted. Errors or malfunctions are reported as in test 1.

2.4.9 Test 10 (Echo Mode Test)

Each of the active lines is placed in the full duplex (transmit/receive) mode and then into the echo mode. The receive should complete without the transmit ever completing. Errors or malfunctions are reported as in test 1.

2.4.10 Test 11 (Synchronization Test)

Each of the active lines is placed in the full duplex (transmit/receive) mode and allowed to run using a fixed set of synchronization characters. Errors or malfunctions are reported as in test 1.

2.4.11 Test 12 (Resync Test)

Each of the active lines is placed in the full duplex (transmit/receive) mode and forced to resync during the test. Errors or malfunctions are reported as in test 1.

2.4.12 Test 13 (Transmit Sync Test)

Each of the active lines is placed in the full duplex (transmit/receive) mode and set to transmit just the receive sync character. The receive is set to receive one character, this should be the transmit sync character. Errors or malfunctions are reported as in test 1.

2.4.13 Test 14 (Auto Parity Test)

This test is applicable to 8 bit data only. Each of the active lines is placed in the full duplex (transmit/receive) mode with parity selected. The most significant bit contains the transmitted parity. This bit is truncated by the receive. Errors or malfunctions are reported as in test 1.

2.4.14 Test 15 (Inhibit Output Data Requests Test)

Each of the active lines is placed in the full duplex (transmit/receive) mode with the ARB bit (Inhibit Output Data Requests) set, and checks when the receive completes that transmit word pointer has not moved. Errors and malfunctions are reported as in test 1.

2.4.15 Test 16 (One Sync Test)

Each of the active lines is placed in the full duplex (transmit/receive) mode, but only one sync character is transmitted. When the transmit completes the receive word pointer should not have moved.

2.4.16 Test 17 (VDM ASCII)

Each of the active lines is placed in the full duplex (transmit/receive) mode with VDM ASCII selected. The most significant bit should always be a one. Errors or malfunctions are reported as in Test 1.

2.4.17 Test 77 (Burn-In)

This test cycles through all the applicable tests except test 0, 7, and 8.

2.5 OUTPUT MESSAGES

Test	
ALL	PASSES nnnnnn (note 1)
ALL	DCM TEST
ALL	LCB ADDRESS =
ALL	DCM ADDRESS =
ALL	INTERRUPT ORIGIN =
ALL	LINE ADAPTER TYPE =
ALL	DATA PATTERN =
ALL	ACTIVE LINES =
ALL	TEST =
ALL	BIT LENGTH =
ALL	MIRROR IMAGE =
ALL	TIMEOUT ON LINE ll (note 2)
ALL	INVALID USE OF LINE ll (note 2)
ALL	NOT A VALID TEST FOR THIS LINE ADAPTER
0	IBCZ INTERRUPT FROM LINE ll (note 2)
ALL	e ERROR ON LINE ll (notes 2 and 3)
ALL	SC INTERRUPT FROM LINE ll ss (notes 2 and 4)
5	LINE ERROR INTERRUPT FROM LINE ll (note 2)
ALL	MEMORY FULL, CAN'T START kk LINES (note 5)
1	CMP ERR LINE ll SHBE vvvvvv WAS iiiiii (notes 2, 6, and 7)
2	CC ERR LINE ll CC cccccc (notes 2 and 8)
4	BREAK TIMEOUT ON LINE ll (note 2)
5	t TIMEOUT, LINE ll (notes 2 and 9)
5	BAD INTERRUPT FROM LINE ll (note 2)
6	CO&I NOT ON AFTER DTR, LINE ll (note 2)
6	CTS NOT AFTER T, LINE ll (note 2)
10	ECHO ERROR, LINE ll (note 2)
11	UNABLE TO SYNC-UP LINE ll WITH pppp (notes 2 and 10)
12	RE-SYNC FAILURE, LINE ll (note 2)
13	TRANSMIT SYNC FAILURE, LINE ll CHAR. pppp (notes 2 and 10)
14	PARITY BIT ERROR, LINE ll (note 2)
15	AR FAILURE, LINE ll (note 2)
16	LINE ll SYNCS UP AFTER ONE SYNC CHARACTER (note 2)
ALL	TERMINATE TEST =
17	ASCII ERROR, LINE ll (note 2)

NOTES:

1. nnnnnn = OCTAL NUMBER OF PASSES
2. ll = LINE NUMBER
3. e = TYPE OF ERROR, F = FRAMING, P = PARITY, O = OVERFLOW, PO = PARITY AND OVERFLOW
4. ss = OCTAL STATUS
5. kk = NUMBER OF LINES
6. vvvvvv = VALID DATA
7. iiiiii = INVALID DATA
8. cccccc = CONTROL CHARACTER (MAY BE LEFT OR RIGHT BYTE)
9. t = TYPE OF INTERRUPT EXPECTED, O = OVERFLOW, C = CONTROL LINE, R = RING
10. pppp = SYNC CHARACTER

2.6 PROGRAM HALTS

Halt	Meaning
01	See section 2.3
02	See section 2.3
03	See section 2.3
04	See section 2.3
051	Test 5 Timeout
052	Test 5 Bad Interrupt
061	Test 6 Bad CO&I
062	Test 6 Bad CTS
0100	Read X register for pointer to message (refer to listing)
0200	Read number of passes from A register

SECTION 3
INTERNAL SPECIFICATIONS

3.1 MEMORY MAP

Locations	Contents
0-1000	Interrupt Area and Output Data Buffer
1000-1717	Operator Communications
1720-1764	LSU/RLS
1765-3013	Subroutines
3014-4031	Interrupt Processors
4032-4705	Individual
10000-12270	Tests
12271-n-1152	Input Buffers
n-1151-n-1024	
n-1023-n	Line Control Block
400-477	Maintain II Communication Block
5100-7777	Maintain II

3.2 SUBROUTINE DESCRIPTIONS

3.2.1 Primary Set-Up

Title:

Primary Set-Up

Symbolic Name:

PRI

Purpose:

To provide for initialization upon start

Description:

Various constants and tables are cleared to initialize the program.

Entry Points:

PRI

Calling Sequence:

JMP PRI

Tables or Files Modified or Read:

MQUE

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

Not applicable

Exception and/or Error Conditions:

None

Timing (cycles):

Not Applicable

Size:

$25_{(8)}$ Words

Comments:

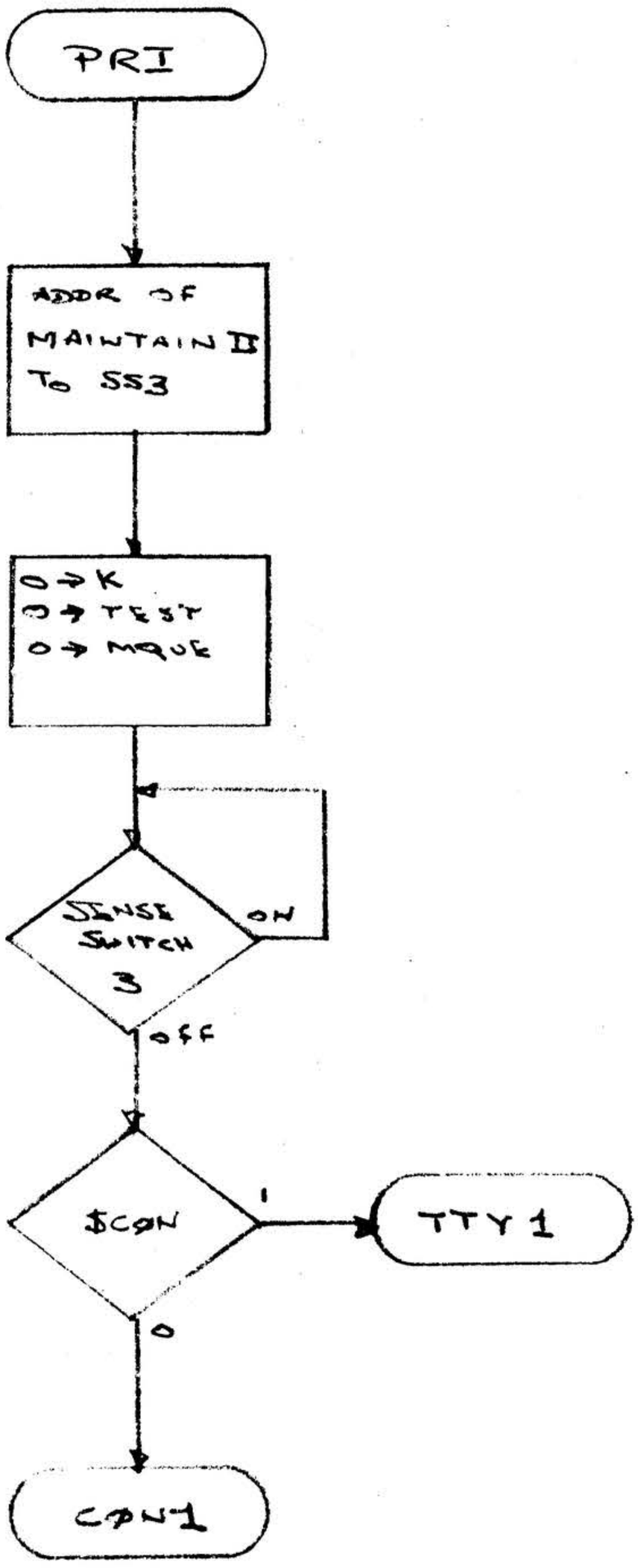
This routine is executed each time the program is started from $1000_{(8)}$ or when SS3 is set during secondary set up.

The Maintain II indicator '$CON' is tested to determine if teletype is available.

Hardware Details:

Not applicable

Flowcharts:



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3.2.2 Secondary Set-Up

Title:

Secondary Set-Up

Symbolic Name:

SEC

Purpose:

To provide for the orderly shutdown of the program in the event of operator termination.

Description:

The routine initializes various variables that pertain to the line adapter.

Entry Points:

SEC, SDWN

Calling Sequence:

JMP SEC, JSS3 SDWN

Tables or Files Modified or Read:

None

Tables or Files Created:

None

Called By Other Routines:

All test routines exit to the routine.

Called From This Routine:

UNQ, CAO, SSWT*

*Maintain II Standard Routine

Exception and/or Error Conditions:

If any test has been completed, the routine displays the number of passes through the test.

Timing (cycles):

Not applicable

Size:

$46_{(8)}$ Words

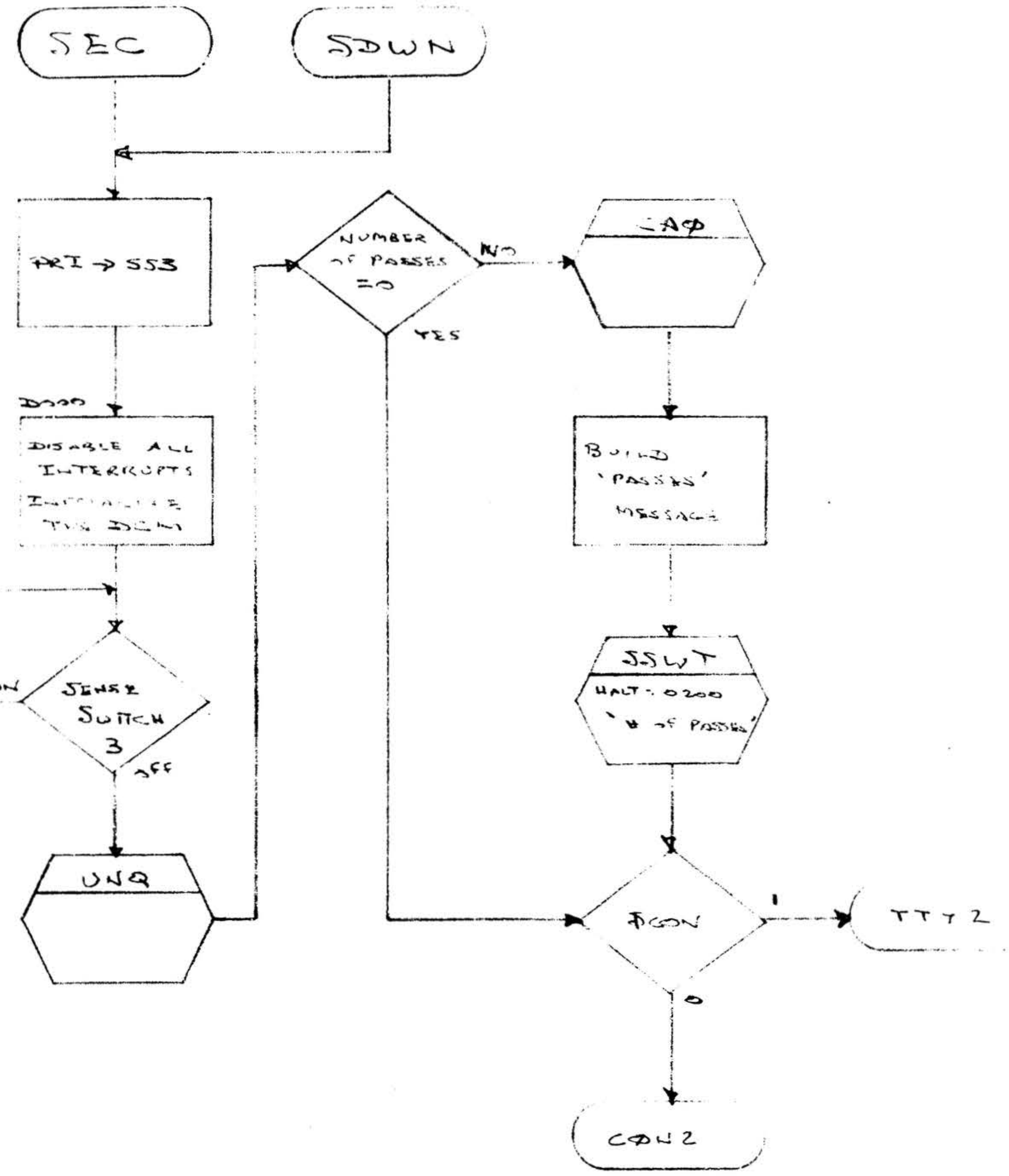
Comments:

The Maintain II indicates '$CON' is tested to determine if teletype is available.

Hardware Details:

Not applicable.

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-7 OF	A REV

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3.2.3 Primary Teletype Set-Up

Title:

Primary Teletype Set-Up

Symbolic Name:

TTY1

Purpose:

To request and accept values that pertain to the DCM

Description:

Messages requesting various parameters required to exercise the DCM are output and their responses are stored for reference.

Entry Points:

TTY1

Calling Sequence:

JMP TTY1

Tables or Files Modified or Read:

None

Tables or Files Created:

Interrupt block origin, output buffer origin

Called By Other Routines:

PRI

Called From This Routine:

OUTD*, OCTI, SDA, INVM

*Maintain II Subroutine

Exception and/or Error Conditions:

Responses are checked for proper range. If out of range the parameter is re-requested.

Timing (cycles):

Not applicable

Size:

$137_{(8)}$ Words

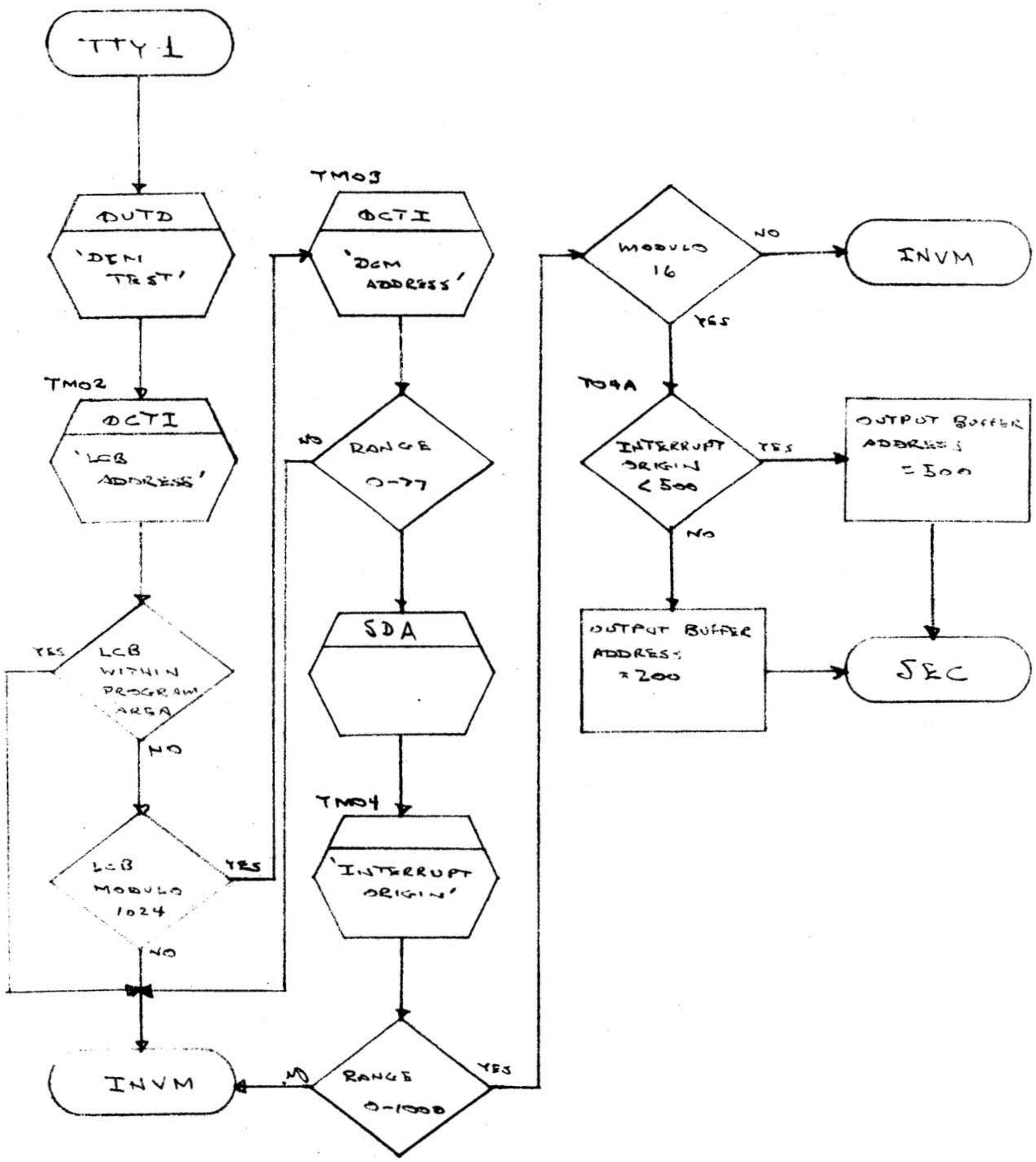
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-10 OF	A REV

3.2.4 Secondary Teletype Set-Up

Title:

Secondary Teletype Set-Up

Symbolic Name:

TTY2

Purpose:

To request and accept values that pertain to the LAD

Description:

Messages requesting various parameters required to exercise the LAD are output and their responses are stored for reference.

Entry Points:

TTY2, T14A

Calling Sequence:

```
JMP TTY2
JMP T14A
```

Tables or Files Modified or Read:

None

Tables or Files Created:

None

Called By Other Routines:

SEC

Called From This Routine:

OCTI, INPG*, INVM, and TJ

*Maintain II Subroutine

Exception and/or Error Conditions:

Responses are checked for proper range. If out of range the parameter is re-requested.

Timing (cycles):

Not applicable

Size:

$136_{(8)}$ Words

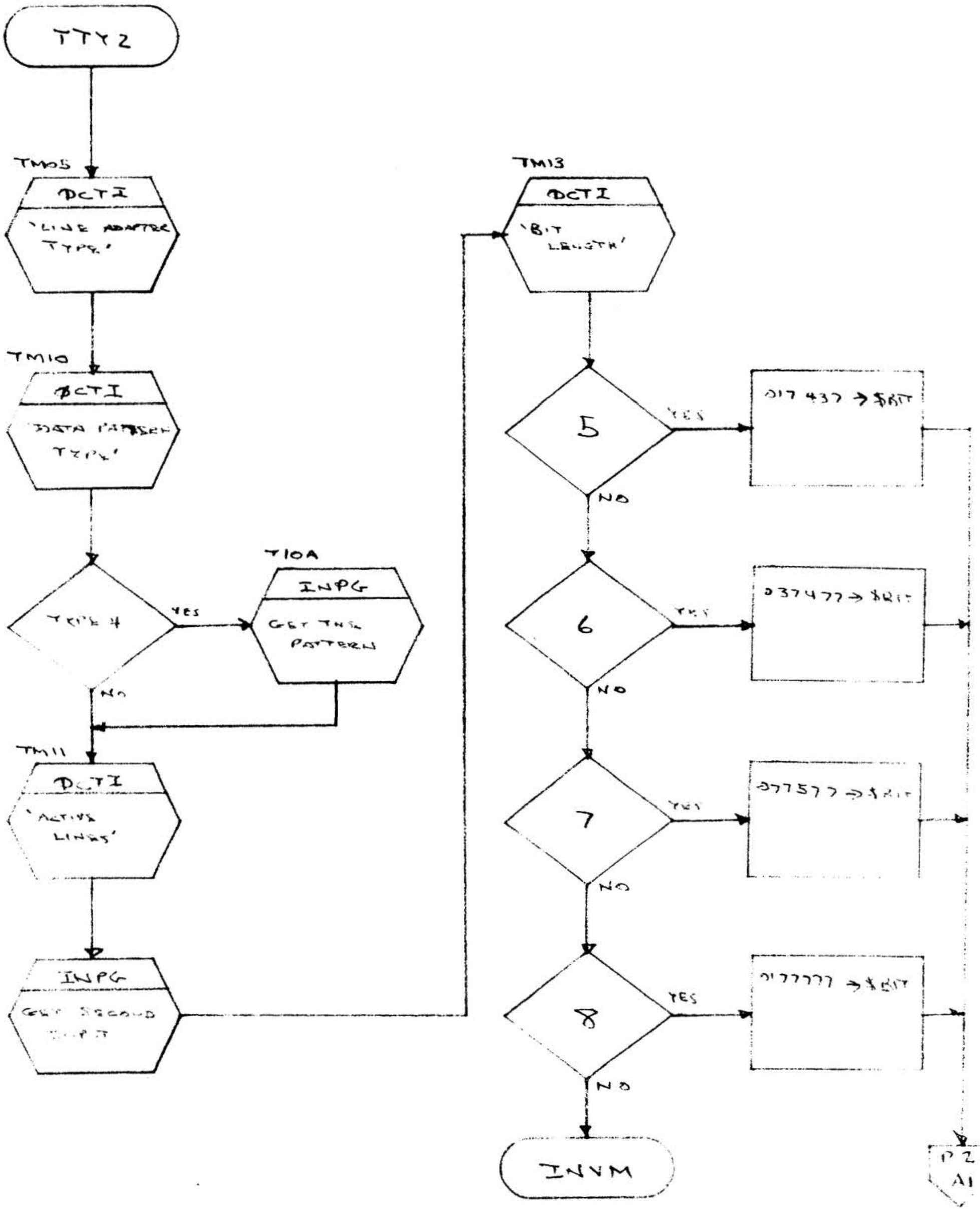
Comments:

None

Hardware Details:

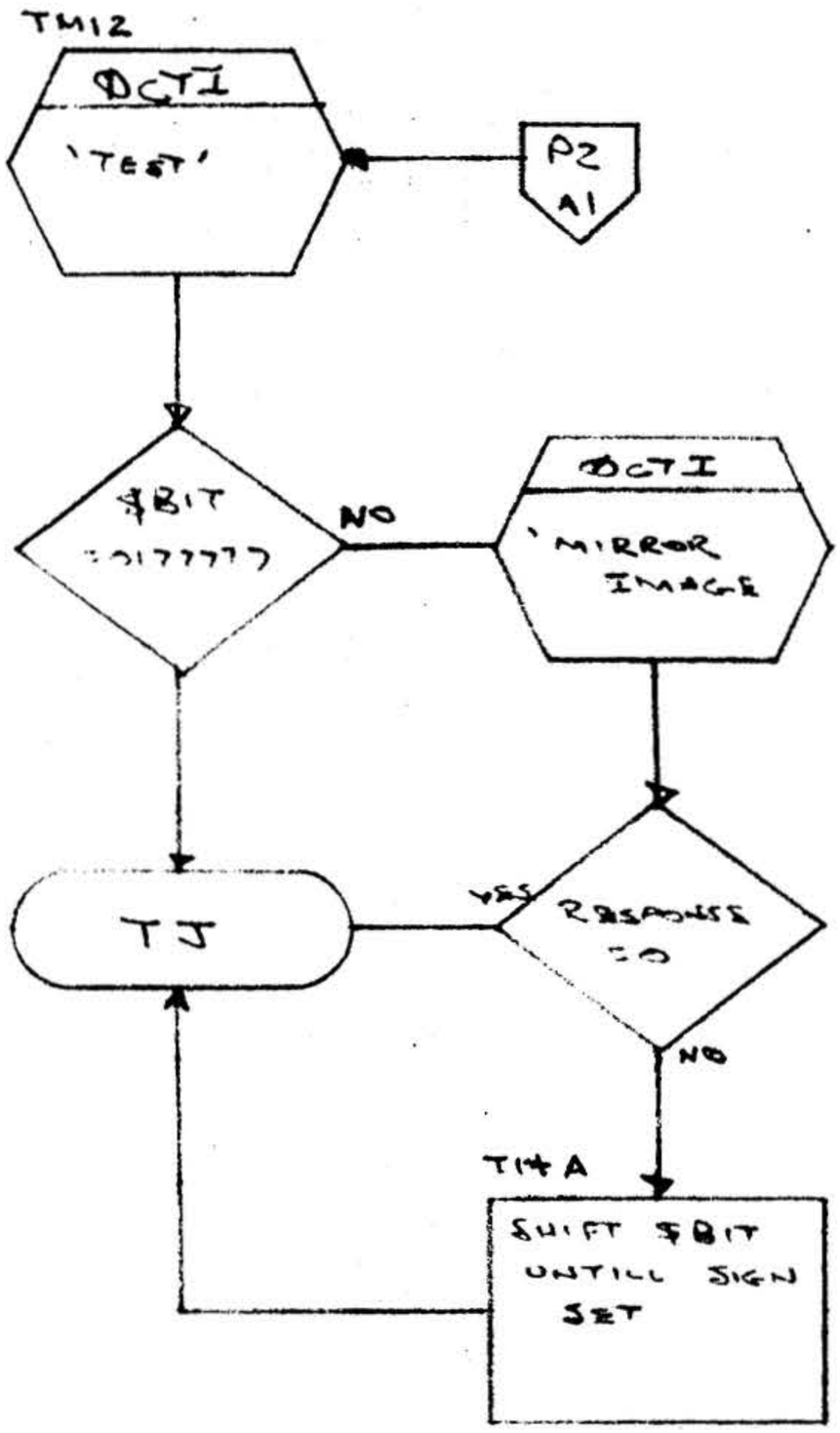
Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256	A
			SH 3-13 OF	REV

96A0393-000



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-14 OF	A REV

96A0393-000

3.2.5 Test Jump

Title:

Test Jump

Symbolic Name:

TJ

Purpose:

To prepare for individual tests

Description:

Upon entry the routine zeros out the time-out table, builds the output buffer, zeros out the line control block, presets certain variables and jumps to the individual test.

Entry Points:

TJ

Calling Sequence:

JMP TJ

Tables or Files Modified or Read:

TOT, LCB

Tables or Files Created:

Output Buffer

Called By Other Routines:

TT77, TTY2, CON2

Called From This Routine:

FOB

Exception and/or Error Conditions:

None

Timing (cycles):

Not applicable

Size:

$103_{(8)}$ Words

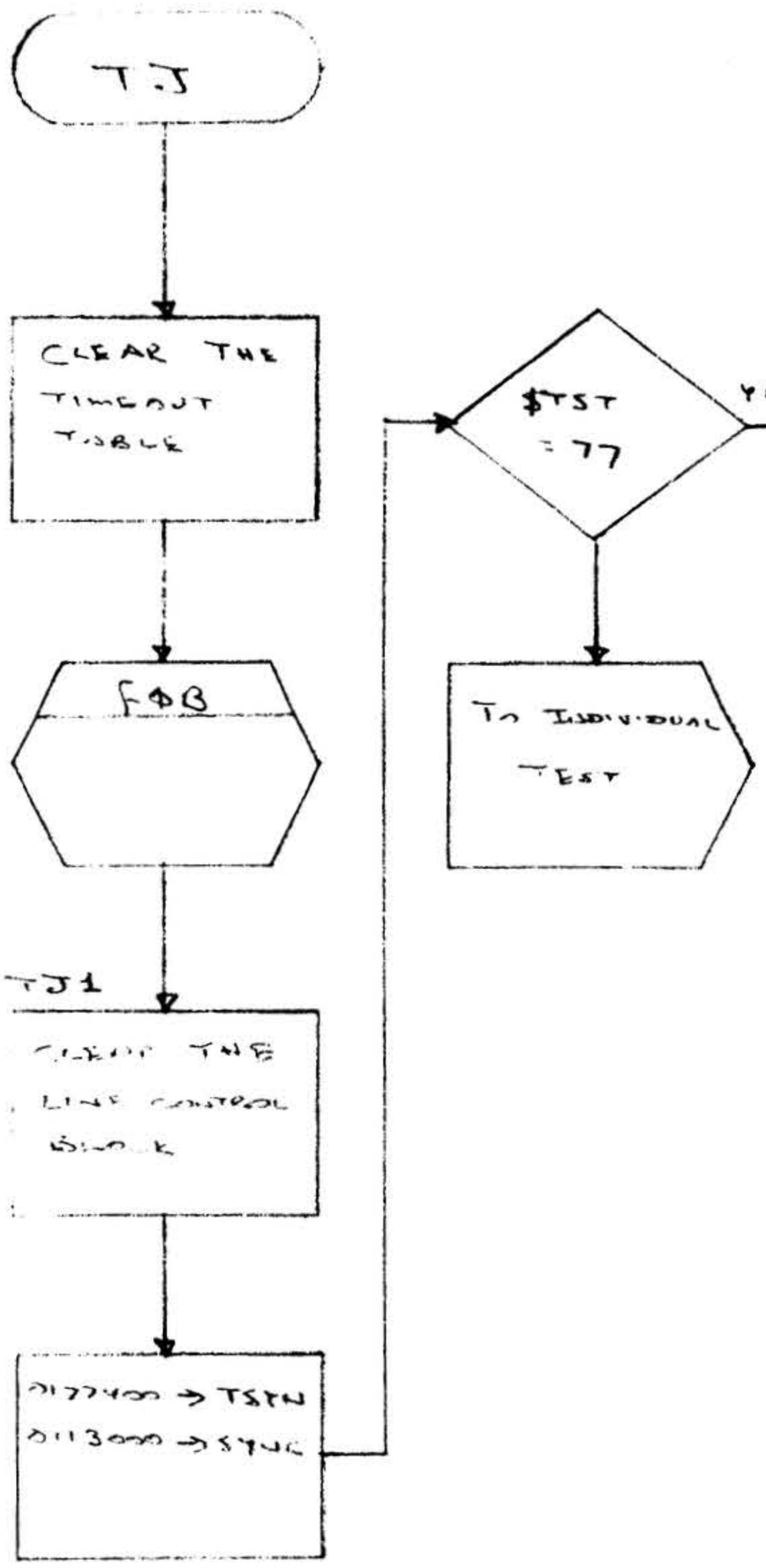
Comments:

None

Hardware Details:

None

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256	A
			SH 3-17 OF	REV

96A0393-000

3.2.6 Console Set-Up

Title:

Console Set-Up

Symbolic Name:

CON1, CON2

Purpose:

To provide for the input of parameters from the switch panel.

Description:

The routine halts at various points to allow the operator to set parameters into the fast registers.

Entry Points:

CON1, CON2

Calling Sequence:

```
JMP CON1
JMP CON2
```

Tables or Files Modified or Read:

System Variables

Tables or Files Created:

Output buffer address and line control block address

Called By Other Routines:

PRI, SEC

Called From This Routine:

SDA and TJ

Exception and/or Error Conditions:

Not applicable

Timing (cycles):

Not applicable

Size:

$57_{(8)}$ Words

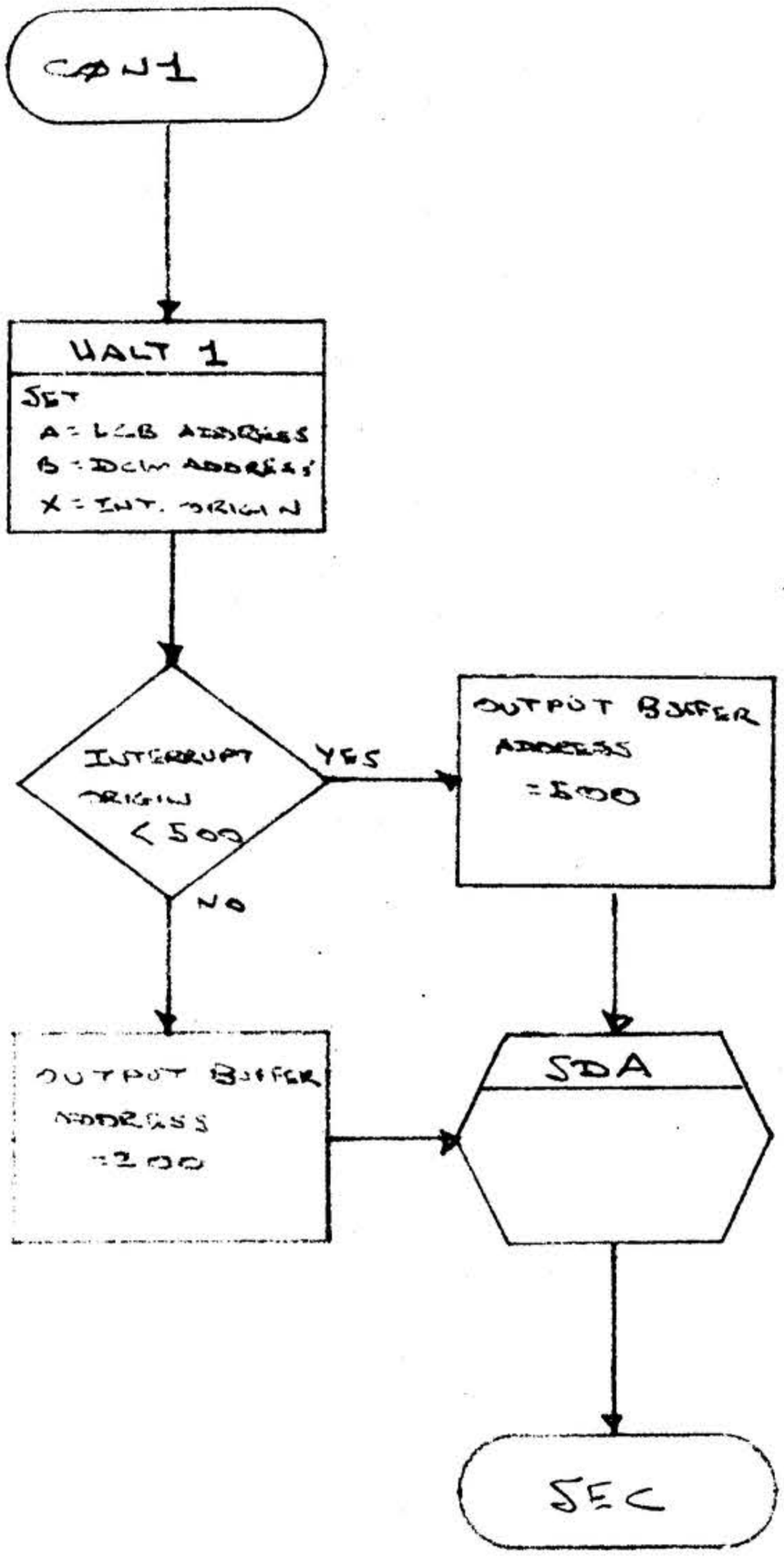
Comments:

None

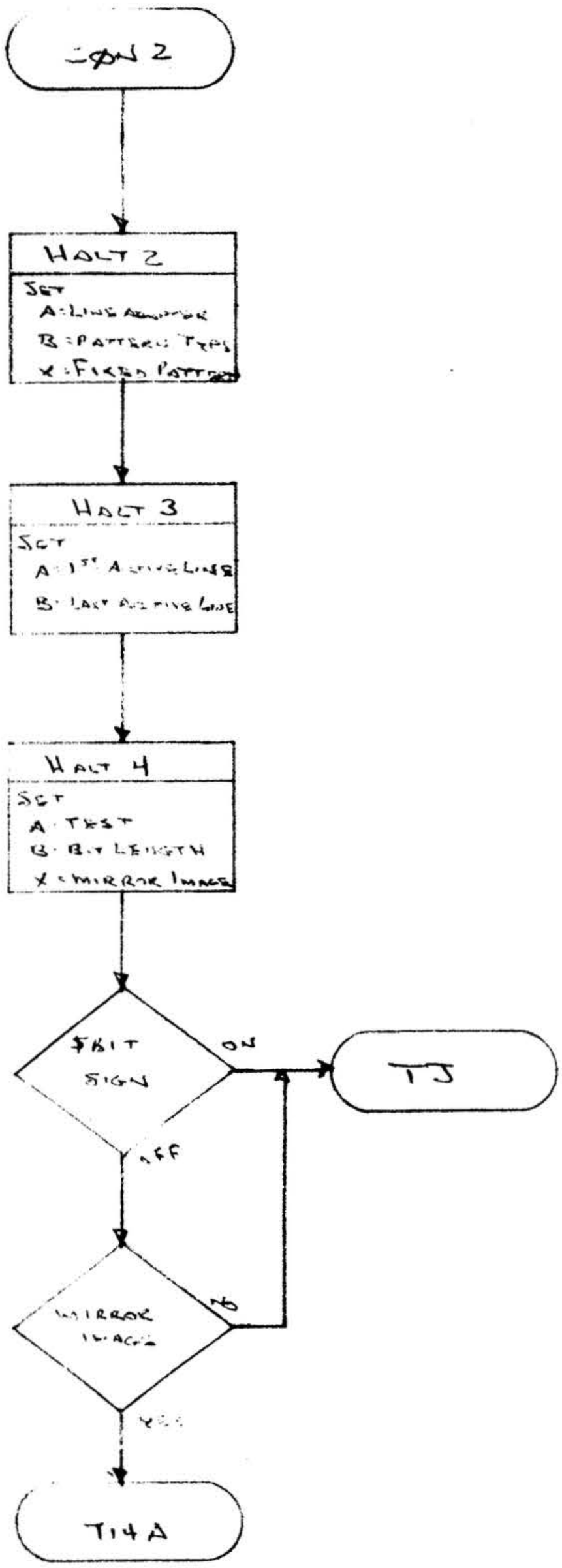
Hardware Details:

None

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-20OF	A REV



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-21 OF	A REV

98A0393-000

3.2.7 Line Set-Up

Title:

Line Set-Up

Symbolic Name:

LSU

Purpose:

To set up line according to the line control byte

Description:

A control interrupt is requested at which time the line control byte is transferred to the DCM.

Entry Points:

LSU

Calling Sequence:

JMPM LSU

Tables or Files Modified or Read:

None

Tables or Files Created:

None

Called By Other Routines:

All tests

Called From This Routine:

None

Exception and/or Error Conditions:

After a half a million cycles delay, if the DCM has not responded, a reset signal is sent to the DCM.

Timing (cycles):

Not applicable

Size:

$21_{(8)}$ Words

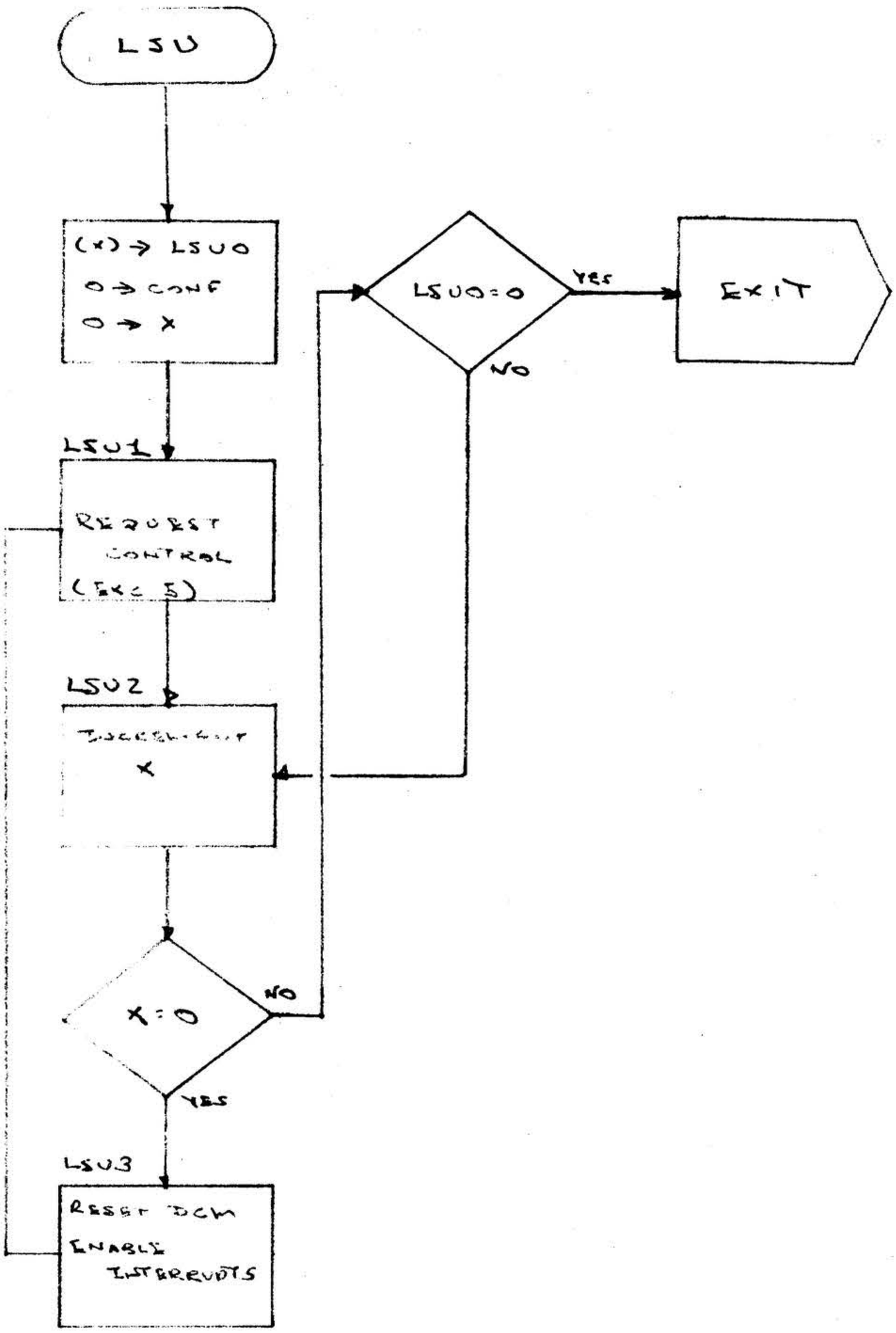
Comments:

None

Hardware Details:

Request control = EXC 5
Reset = EXC 1

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-24 OF	A REV

3.2.8 Read Line Status

Title:

Read Line Status

Symbolic Name:

RLS

Purpose:

To read the DCM line status

Description:

A control is requested at which time the line status byte is transferred from the DCM.

Entry Points:

RLS

Calling Sequence:

```
JMPM  RLS
```

Tables or Files Modified or Read:

None

Tables or Files Created:

None

Called By Other Routines:

TST6

Called From This Routine:

None

Exception and/or Error Conditions:

After a half a million cycle delay, if the DCM has not responded a reset signal is sent to the DCM.

Timing (cycles):

Not applicable

Size:

$24_{(8)}$ Words

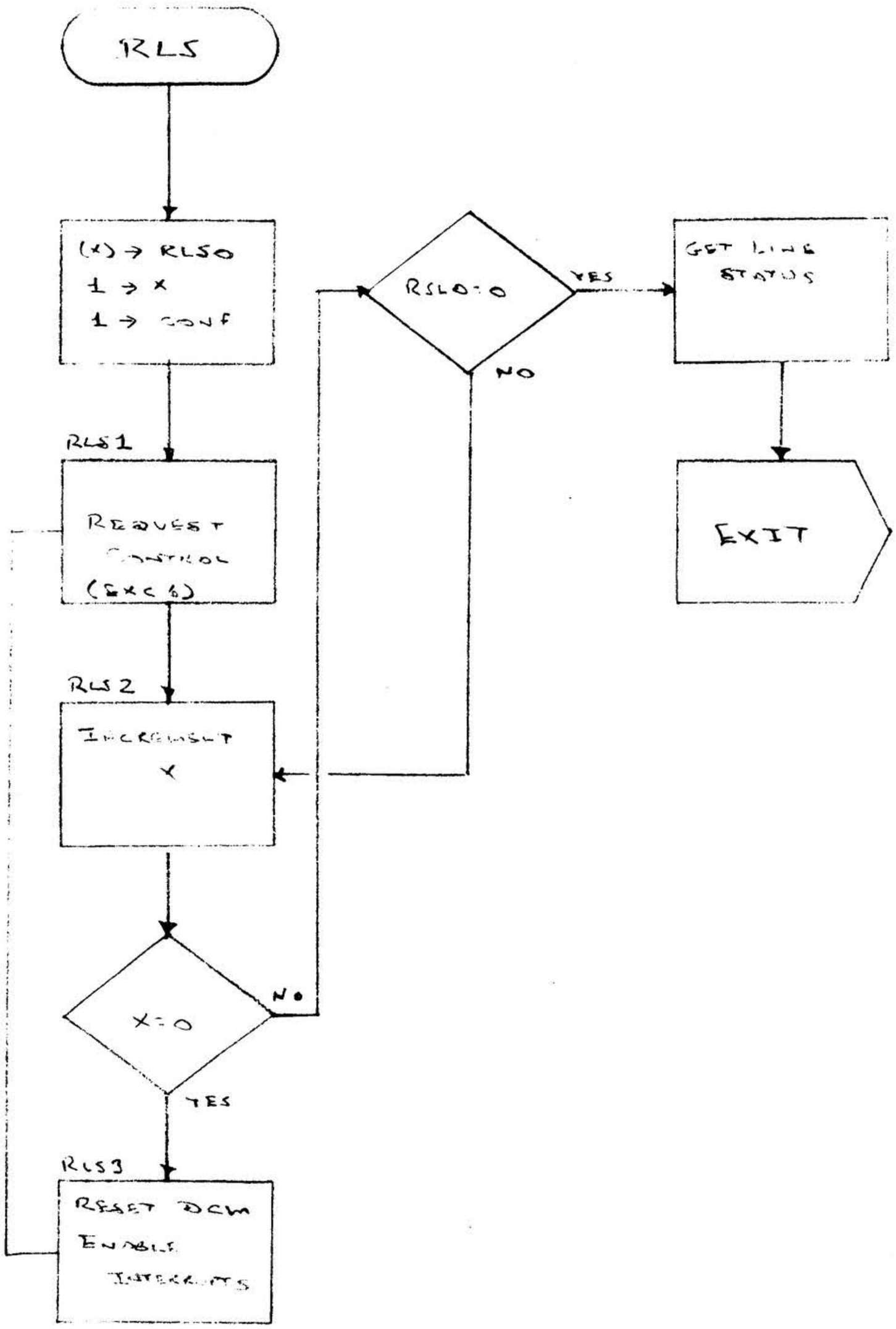
Comments:

None

Hardware Details:

Request control = EXC 6
Reset = EXC 1

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A025.6 SH 3-27OF	A REV

96A0393-000

3.2.9 Allocate Input Buffer

Title:

Allocate Input Buffer

Symbolic Name:

AIB

Purpose:

To return, via B register, the address of a 128 word input buffer

Description:

The routine uses $HIB (High Input Buffer, preset to below the LCB) to allocate a 128 word buffer when $HIB is less than EPA (End of Programming Area) an error results and B = zero.

Entry Points:

AIB

Calling Sequence:

```
JMPM  AIB
```

Tables or Files Modified or Read:

$HIB

Tables or Files Created:

None

Called By Other Routines:

All tests

Called From This Routine:

Not applicable

Exception and/or Error Conditions:

B = zero indicates no more memory available

Timing (cycles):

Not applicable

Size:

$16_{(8)}$ Words

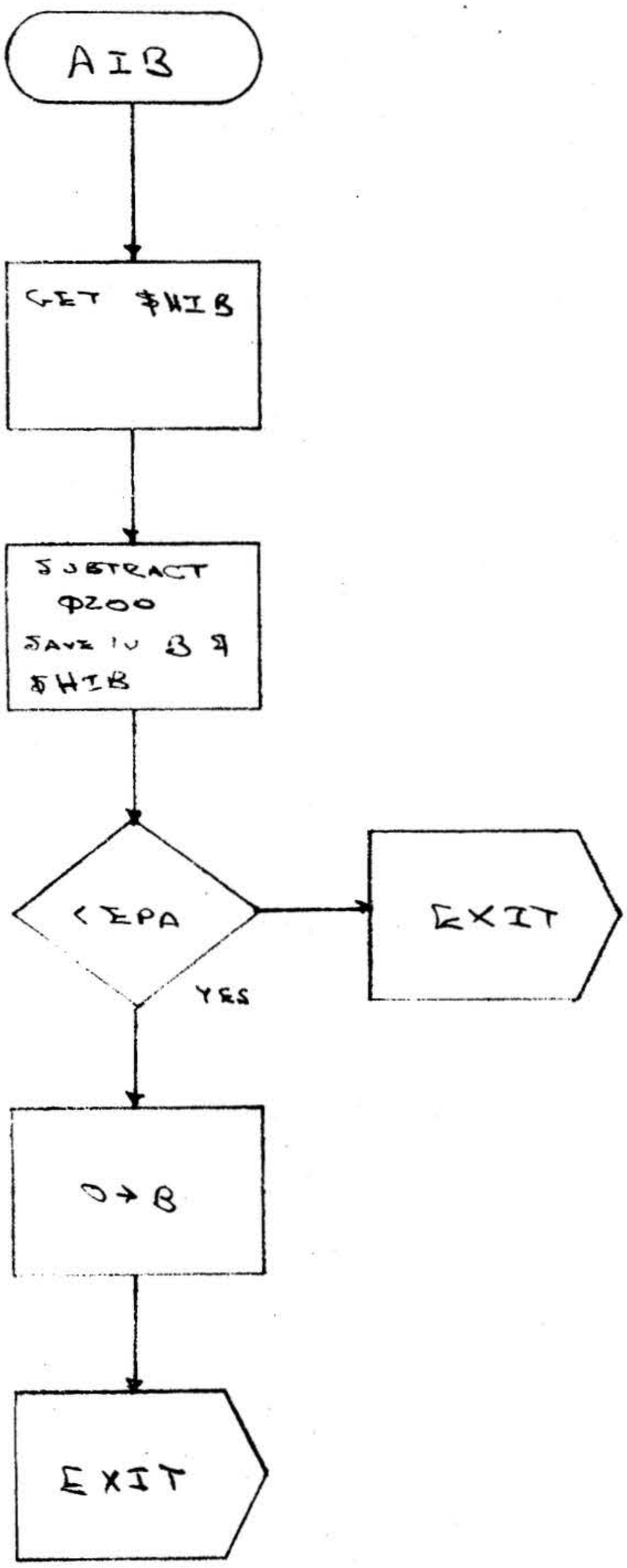
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256	A
			SH 3-36 OF	REV

98A0393-000

3.2.10 **Fill Output Buffer**

Title:

Fill Output Buffer

Symbolic Name:

FOB

Purpose:

To load the output data buffer with the requested pattern

Description:

The routine loads the output data buffer from a variable (SDPT) set up during secondary input

0 = All zeros
1 = All ones
2 = Ascending binary
3 = Alternating ones and zeros
4 = Fixed

Entry Points:

FOB

Calling Sequence:

JMPM FOB

Tables or Files Modified or Read:

Output data buffer

Tables or Files Created:

None

Called By Other Routines:

TJ

Called From This Routine:

None

Exception and/or Error Conditions:

None

Timing (cycles):

Not applicable

Size:

$51_{(8)}$ Words

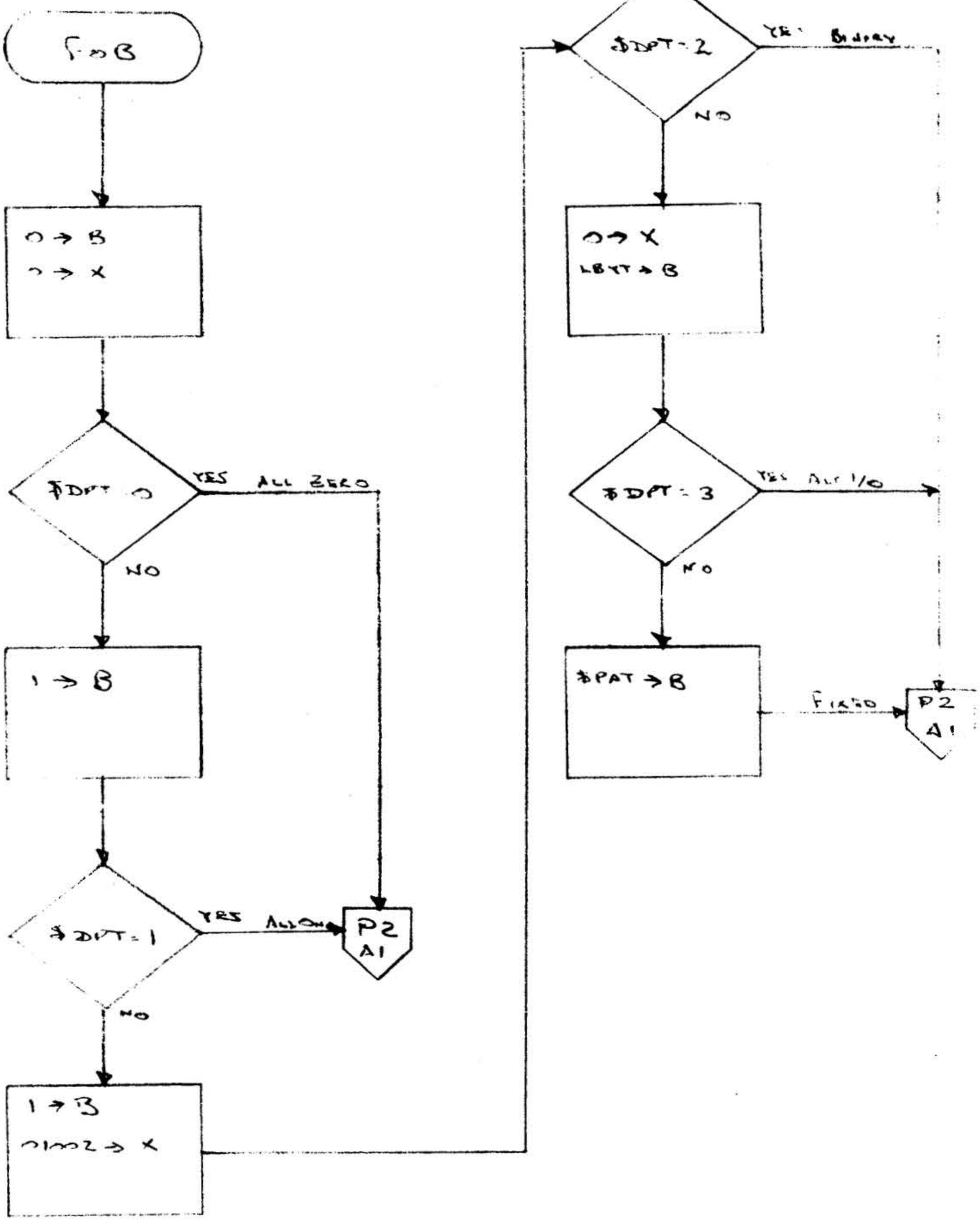
Comments:

None

Hardware Details:

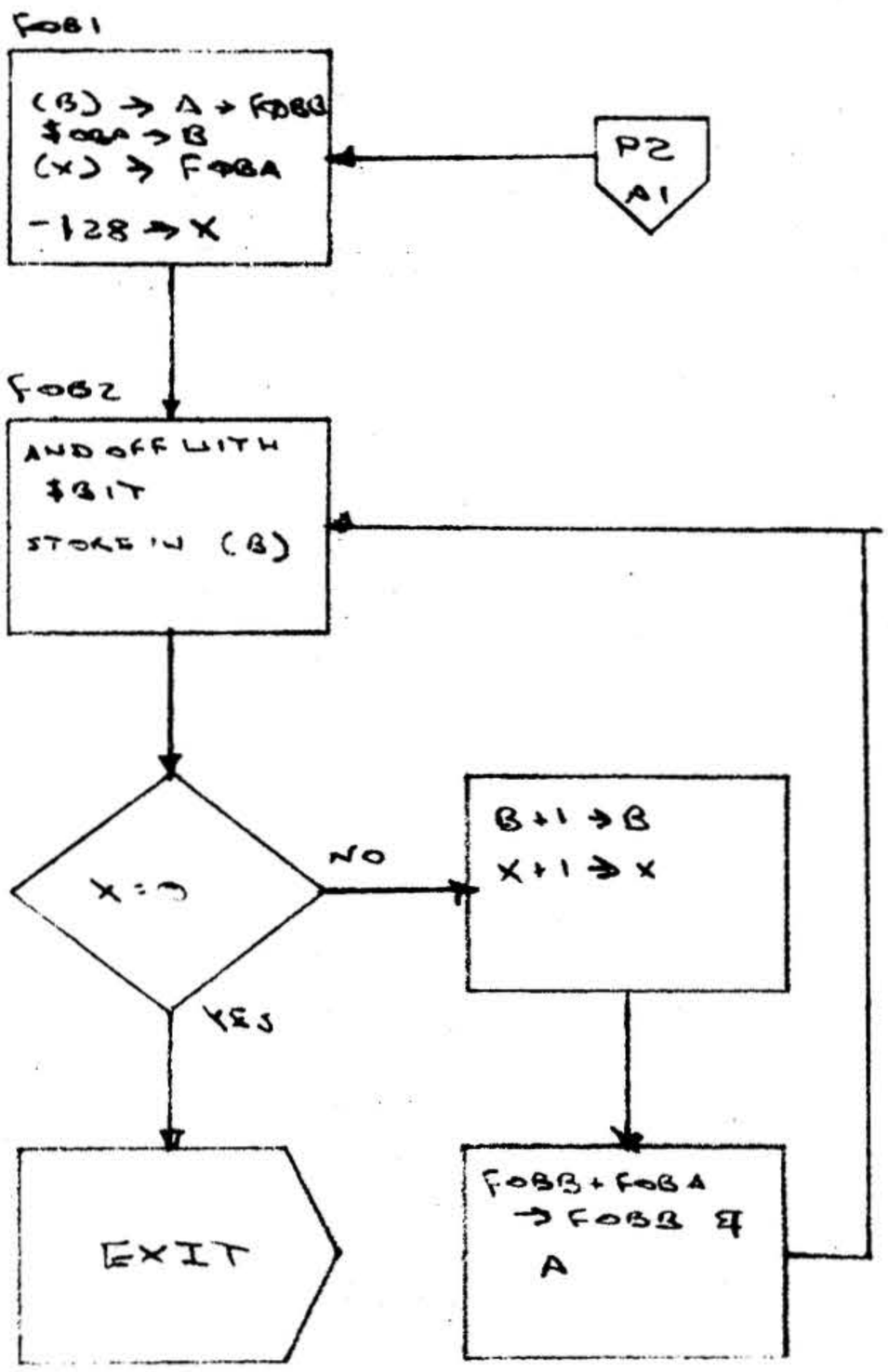
Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256	A
			SH 3-33 OF	REV

96A0393-000



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-34 OF	A REV

98A0393-000

3.2.11 Convert To ASCII Octal

Title:

Convert To ASCII Octal

Symbolic Name:

CAO

Purpose:

To convert a binary number to six ASCII characters representing the octal value

Description:

The number in A is rotated with constants into the B register, then saved.

Entry Points:

CAO

Calling Sequence:

to A
JMPM CAO
X = 1st 2 characters, A = Next 2, B = Last 2

Tables or Files Modified or Read:

None

Tables or Files Created:

None

Called By Other Routines:

All tests

Called From This Routine:

None

Exception and/or Error Conditions:

16 Bit Computer only

Timing (cycles):

Not applicable

Size:

$25_{(8)}$ Words

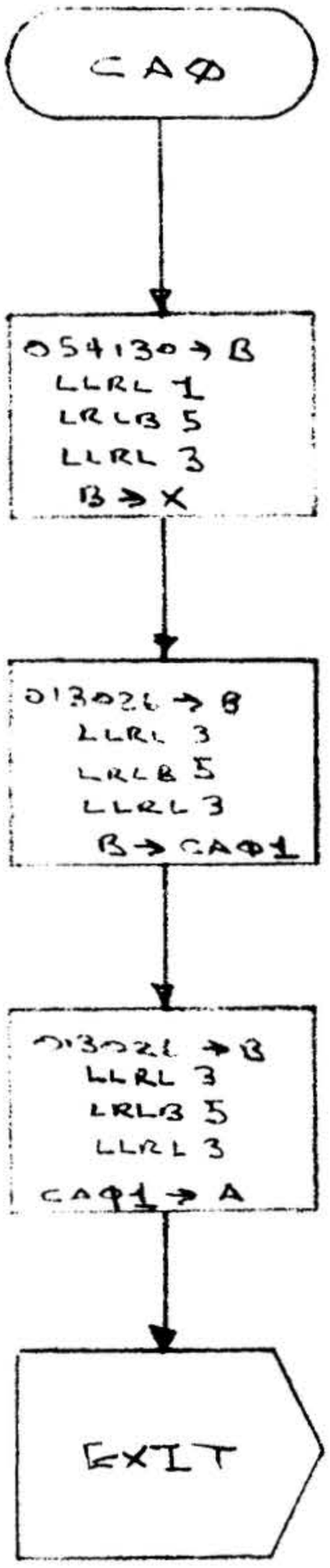
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-37OF	A REV

96A0393-000

3.2.12 Queue A Message

Title:

Queue A Message

Symbolic Name:

QUE

Purpose:

To queue an error or information message for later output

Description:

The message address (X) is placed in the first vacent slot of table MQUE.

Entry Points:

QUE

Calling Sequence:

```
LDXI  MSG
JMPM  QUE
```

Tables or Files Modified or Read:

MQUE

Tables or Files Created:

None

Called By Other Routines:

All tests

Called From This Routine:

None

Exception and/or Error Conditions:

The queue will hold 8 messages. Attempts to queue more will result in the message being lost.

Timing (cycles):

Not applicable

Size:

$30_{(8)}$ Words

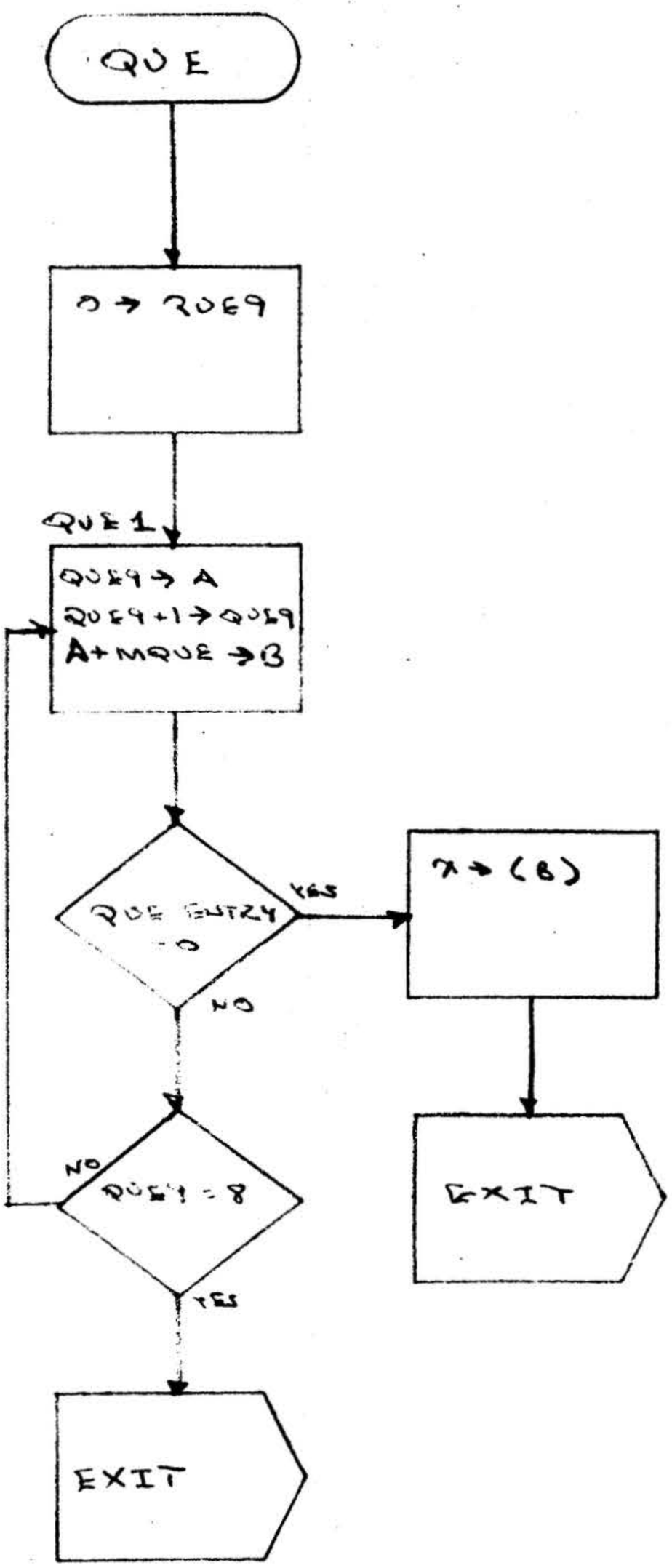
Comments:

None

Hardware Details:

Not Applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-40 OF	A REV

96A0393-000

3.2.13 Unqueue a Queued Message

Title:

Unqueue a Queued Message

Symbolic Name:

UNQ

Purpose:

To unqueue and output a queued message.

Description:

The table MQUE is searched for a non-zero entry. This entry is the address of a message. This message is output via the Maintain II SSWT routine.

Entry Points:

UNQ

Calling Sequence:

```
JMPM  UNQ
```

Tables or Files Modified or Read:

MQUE

Tables or Files Created:

None

Called By Other Routines:

All tests.

Called From This Routine:

SSWT*

*Maintain II Routine

Exception and/or Error Conditions:

At requested halt 0100 the X register will point to the output message.

Timing:

Not applicable

Size:

$66_{(8)}$ words

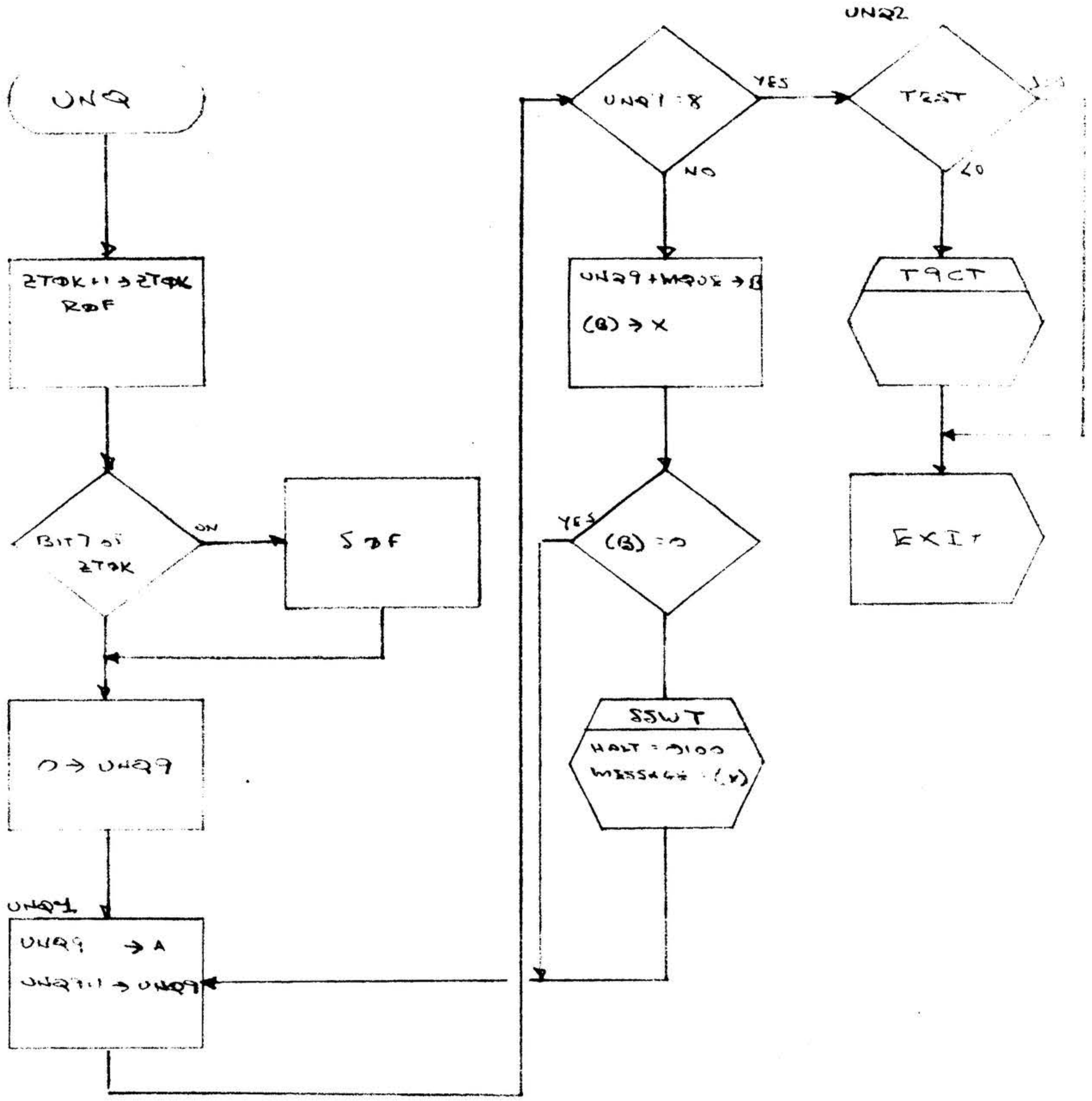
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-43 OF	A REV

3.2.14 Move Interrupt Block

Title:

Move Interrupt Block

Symbolic Name:

MIB

Purpose:

To build the DCM interrupt area.

Description:

The routine builds the interrupt area from a parameter list in X.

Entry Points:

MIB

Calling Sequence:

```
LDXI    Interrupt list
JMPM    MIB
```

Tables or Files Modified or Read:

Interrupt Area

Tables or Files Created:

Not applicable

Called By Other Routines:

All tests.

Called From This Routine:

None

Exception and/or Error Conditions:

After the last entry in the list, a zero word must follow.

Timing:

Not applicable

Size:

$15_{(8)}$ words

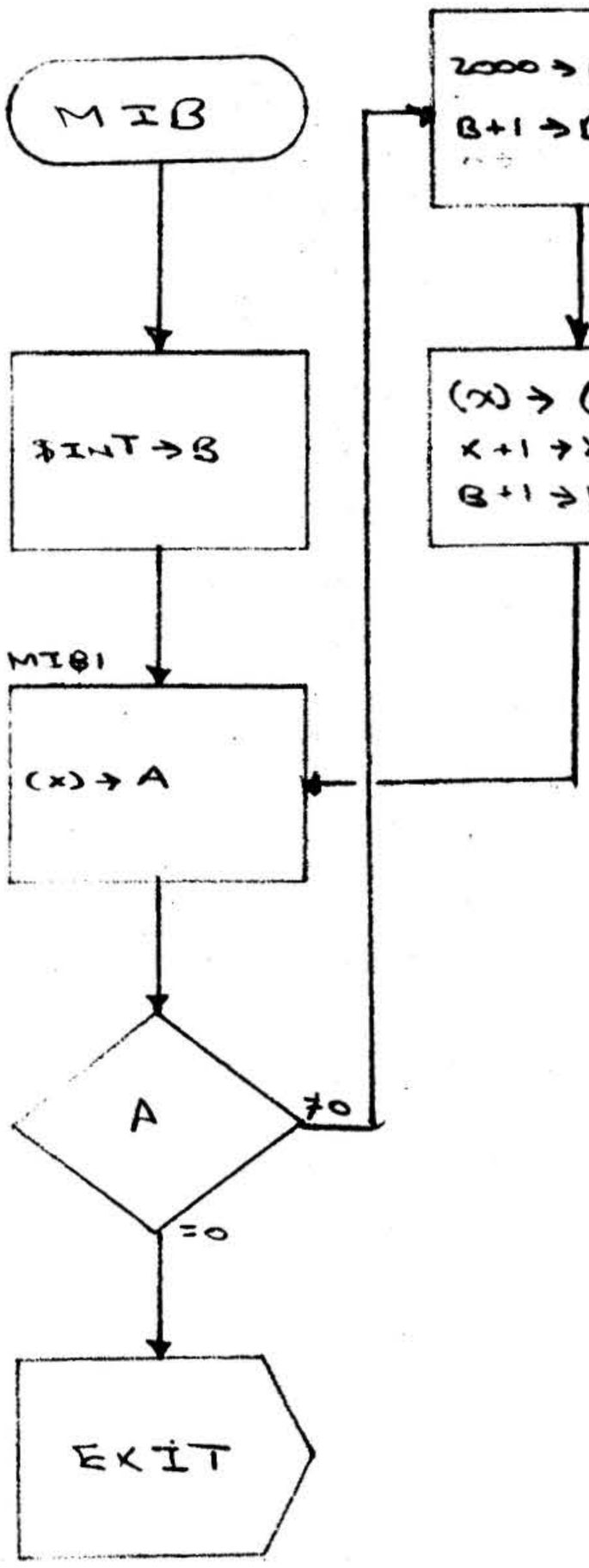
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-46 OF	A REV

3.2.15 Set Device Address

Title:

Set Device Address

Symbolic Name:

SDA

Purpose:

To place the DCM DA into necessary I/O instructions.

Description:

The last 6 bits of each I/O instruction, as defined in list $DAT, is modified to contain the DCM device address as input during the primary input.

Entry Points:

SDA

Calling Sequence:

```
JMPM  SDA
```

Tables or Files Modified or Read:

Selected I/O instructions.

Tables or Files Created:

None

Called By Other Routines:

TTY1 and CON1

Called By This Routine:

None

Exception and/or Error Conditions:

None

Timing:

Not applicable

Size:

$50_{(8)}$ words

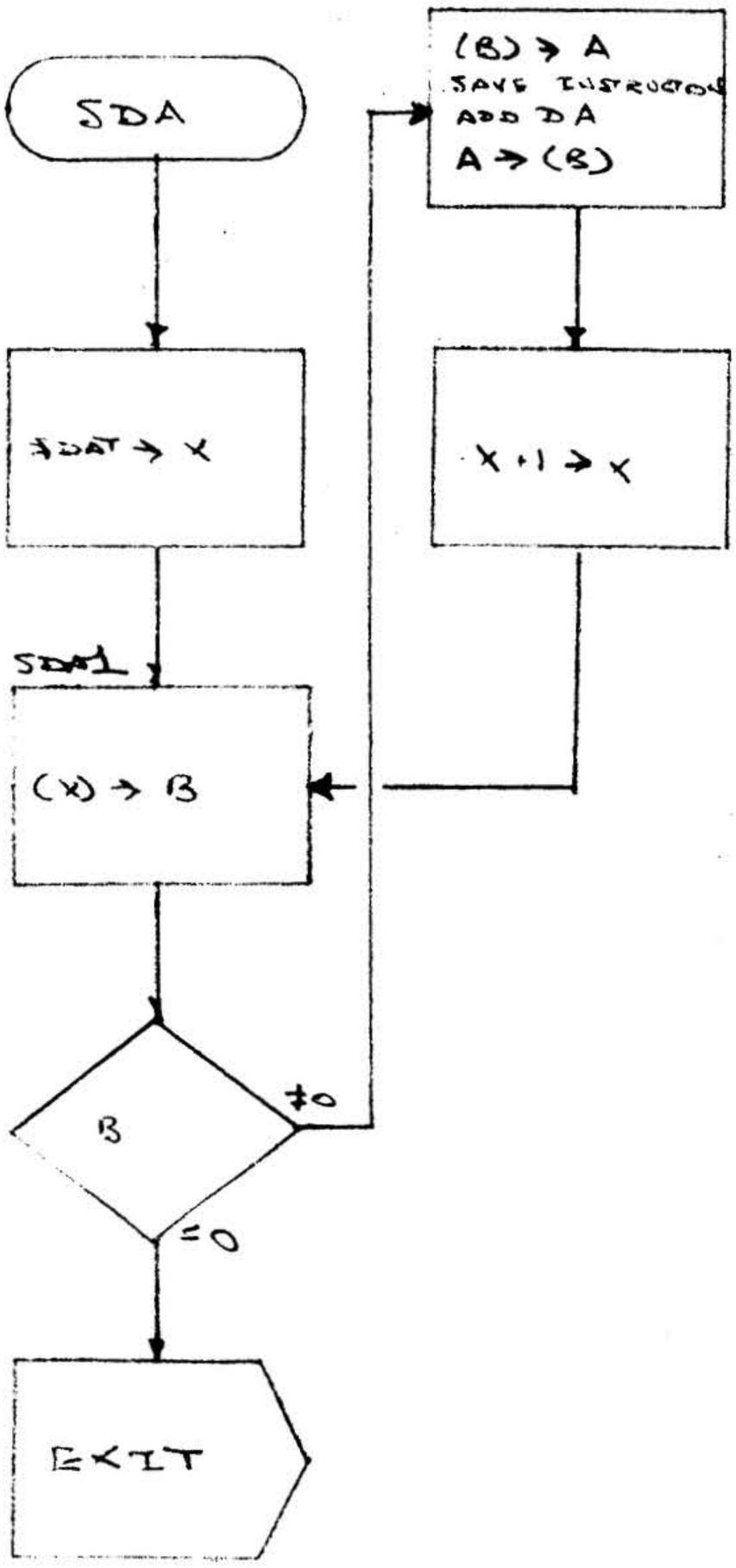
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256	A
			SH 3-49 OF	REV

3.2.16 Print Question and Except Response

Title:

Print Question and Except Response

Symbolic Name:

OCTI

Purpose:

To output parameter requests and to input their octal response.

Description:

The routine uses Maintain II subroutines to output the request message and to input the octal response.

Entry Points:

OCTI

Calling Sequence:

```
LDXI    MESSAGE
JMPM    OCTI
Response in A
```

Tables or Files Modified or Read:

None

Tables or Files Created:

None

Called By Other Routines:

TTY1, TTY2

Called From This Routine:

OUTD*, INPG*

*Maintain II subroutines

Exception and/or Error Conditions:

Sense Switch 3 returns via SS3, / retypes the request.

Timing:

Not applicable

Size:

$17_{(8)}$ words

Comments:

None

Hardware Details:

Not applicable

Flowcharts:

None

3.2.17 Type Invalid

Title:

Type Invalid

Symbolic Name:

INVM

Purpose:

To type "INVALID" after an invalid response and then request a new parameter.

Description:

The routine uses the Maintain II subroutine to type "INVALID" then branches to OCTI to reoutput the request and input the corrected response.

Entry Points:

INVM

Calling Sequence:

JMPM INVM

Tables or Files Modified or Read:

None

Tables or Files Created:

None

Called By Other Routines:

TTY1, TTY2

Called From This Routine:

OCTI

Exception and/or Error Conditions:

None

Timing:

Not applicable

Size:

4 words

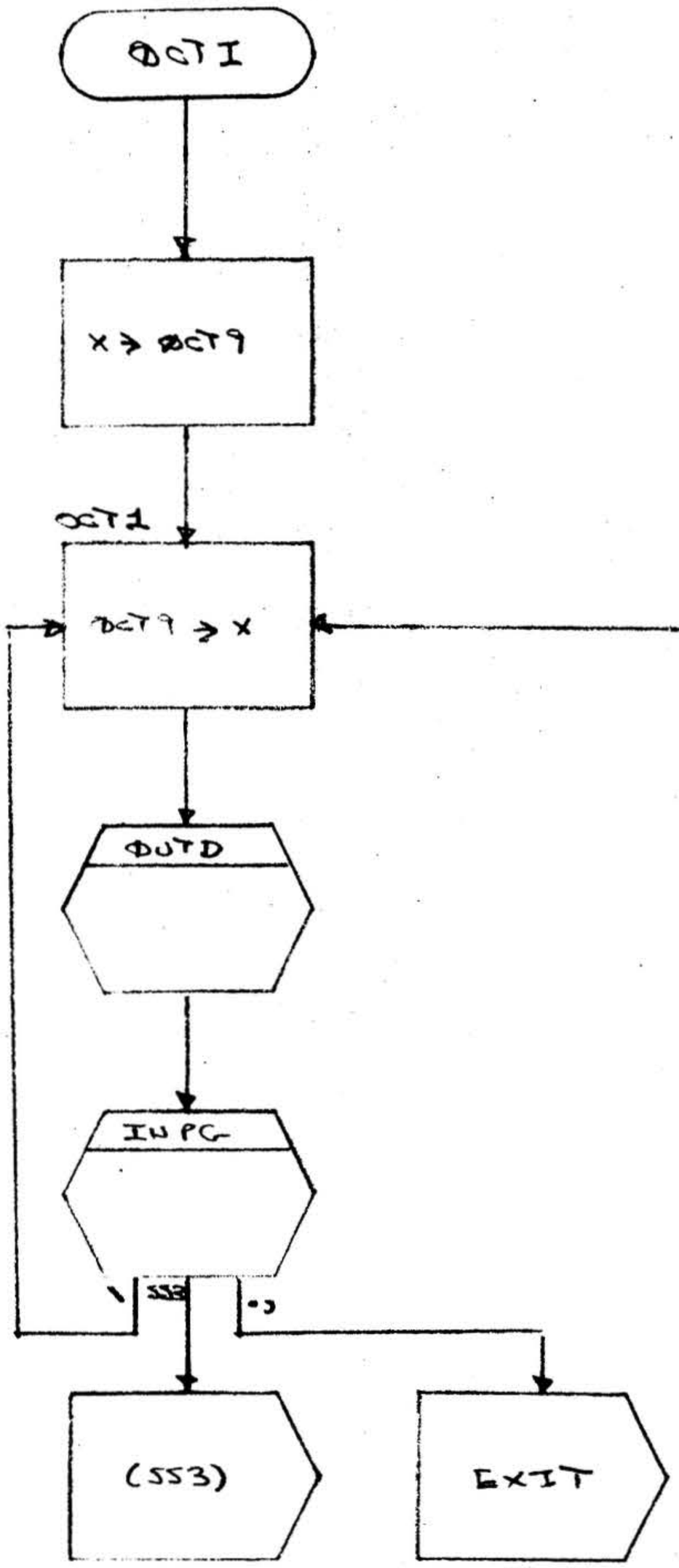
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-54 OF	A REV

98A0393-000

3.2.18 Increment and Test for Timeout

Title:

Increment and Test for Timeout

Symbolic Name:

TIMO

Purpose:

To provide a timeout routine for each active line.

Description:

The table TOT is scanned for a non-zero entry; if the entry is negative the associated line has timed-out and the appropriate message is queued, if the entry is positive, it is incremented by 1.

Entry Points:

TIMO

Calling Sequence:

JMPM TIMO
A negative A indicates the line in bits 5-0 has timed-out.

Tables or Files Modified or Read:

TOT

Tables or Files Created:

None

Called By Other Routines:

All tests.

Called From This Routine:

CAO, QUE

Exception and/or Error Conditions:

None

Timing:

Not applicable

Size:

$161_{(8)}$

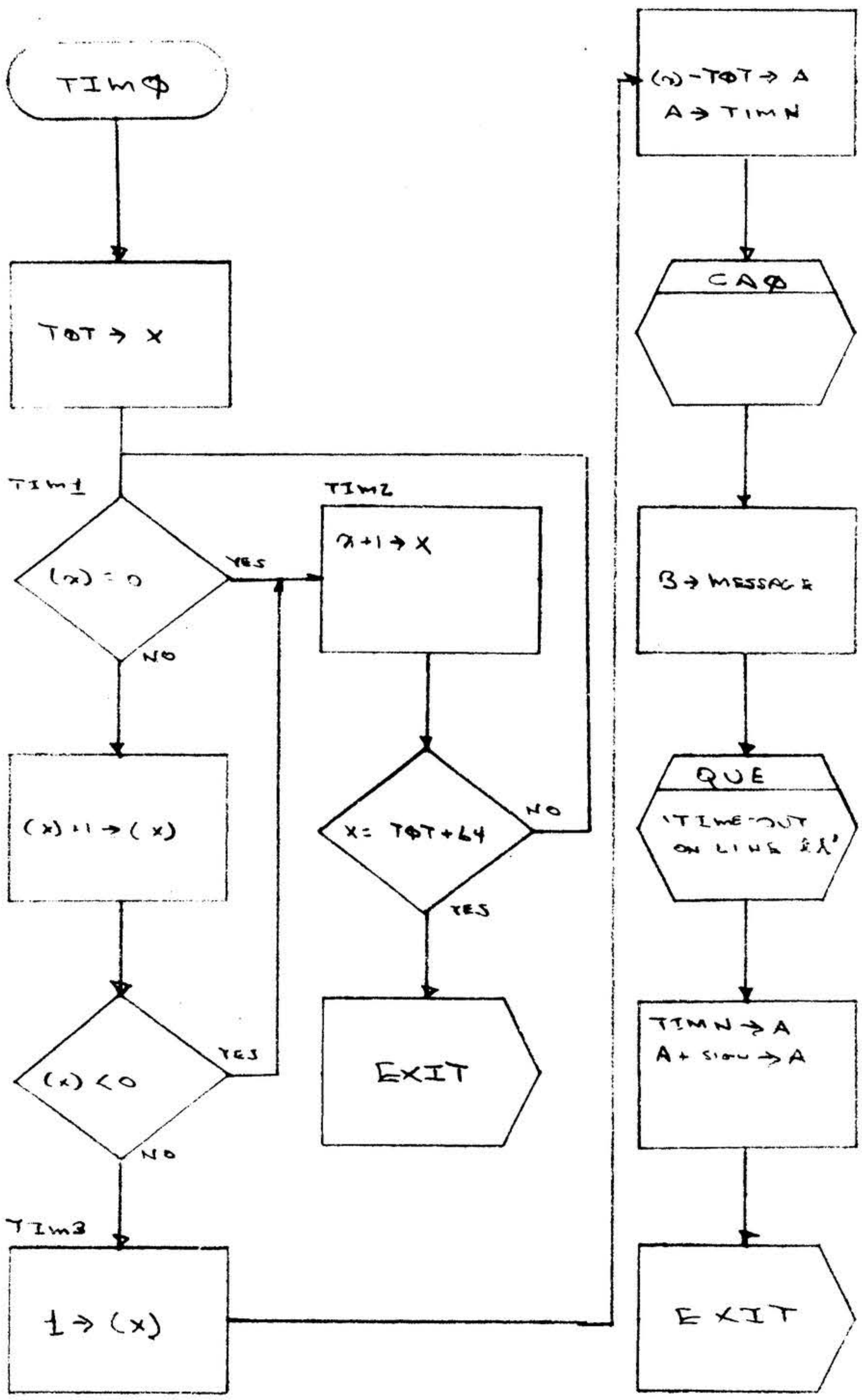
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256	A
			SH3-57 OF	REV

96A0393-000

3.2.19 Clear Timeout

Title:

Clear Timeout

Symbolic Name:

ZTO

Purpose:

To reset the timeout constant for selected lines.

Description:

As each line interrupts, its address is passed to ZTO to allow resetting the lines timeout variable.

Entry Points:

ZTO

Calling Sequence:

```
LDA   LINE
JMPM  ZTO
```

Tables or Files Modified or Read:

TOT

Tables or Files Created:

None

Called By Other Routines:

All interrupt processors.

Called From This Routine:

QUE

Exception and/or Error Conditions:

If the line is below the lowest active line or above the highest active line, the message "INVALID USE OF LINE ll" is queued.

Timing:

Not applicable

Size:

$60_{(8)}$ words

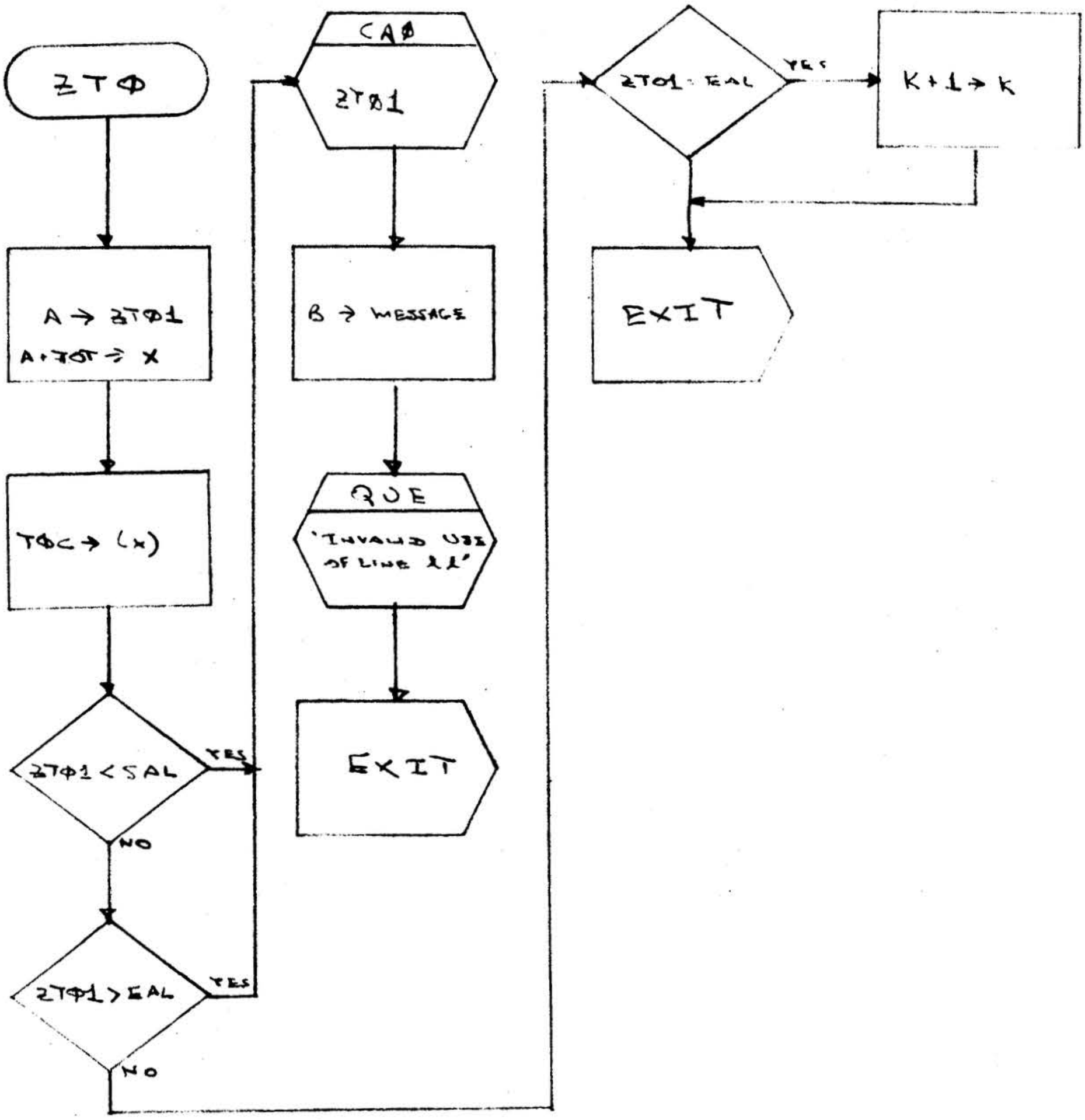
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-60 OF	A REV

3.2.20 Restart Line

Title:

Restart Line

Symbolic Name:

RLIN

Purpose:

To restart a timed-out line.

Description:

The line control block is reset to specific values and LSU is used to restart the line.

Entry Points:

RLIN

Calling Sequence:

A = Line Number
JMPM RLIN

Tables or Files Modified or Read:

LCB

Tables or Files Created:

None

Called By Other Routines:

All tests.

Called From This Routine:

STST, LSU

Exception and/or Error Conditions:

Do to preset values used to restart a line, the line may error in different areas.

Timing:

Not applicable

Size:

$24_{(8)}$ words

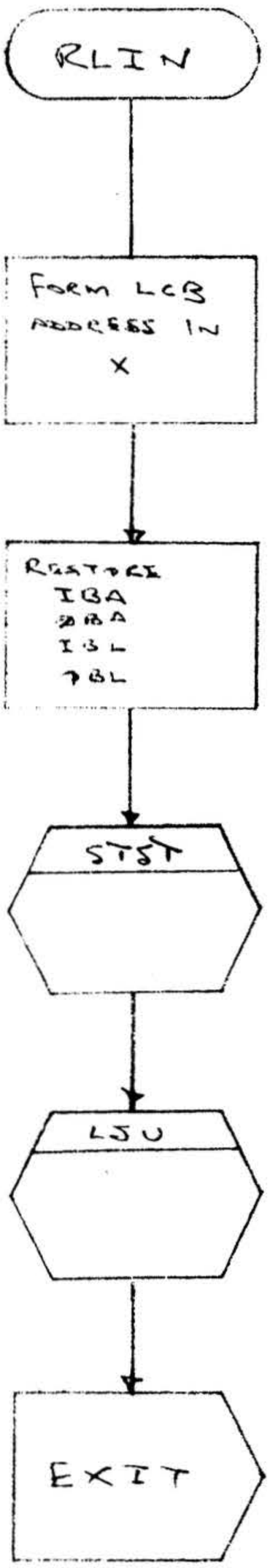
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-63 OF	A REV

3.2.21 Synchronous Test

Title:

Synchronous Test

Symbolic Name:

STST

Purpose:

To set-up the LCB for a synchronous line.

Description:

Prior to using LSU to start a line STST should be used if the test is used for synchronous lines. The LCB is modified to output the sync characters and the line is prepared to receive these sync characters.

Entry Points:

STST

Calling Sequence:

X = Line Control Block
JMPM STST

Tables or Files modified or Read:

LCB

Tables or Files Created:

None

Called By Other Routines:

All type 4 tests.

Called From This Routine:

LSU

Exception and/or Error Conditions:

None

Timing:

Not applicable

Size:

$63_{(8)}$ words

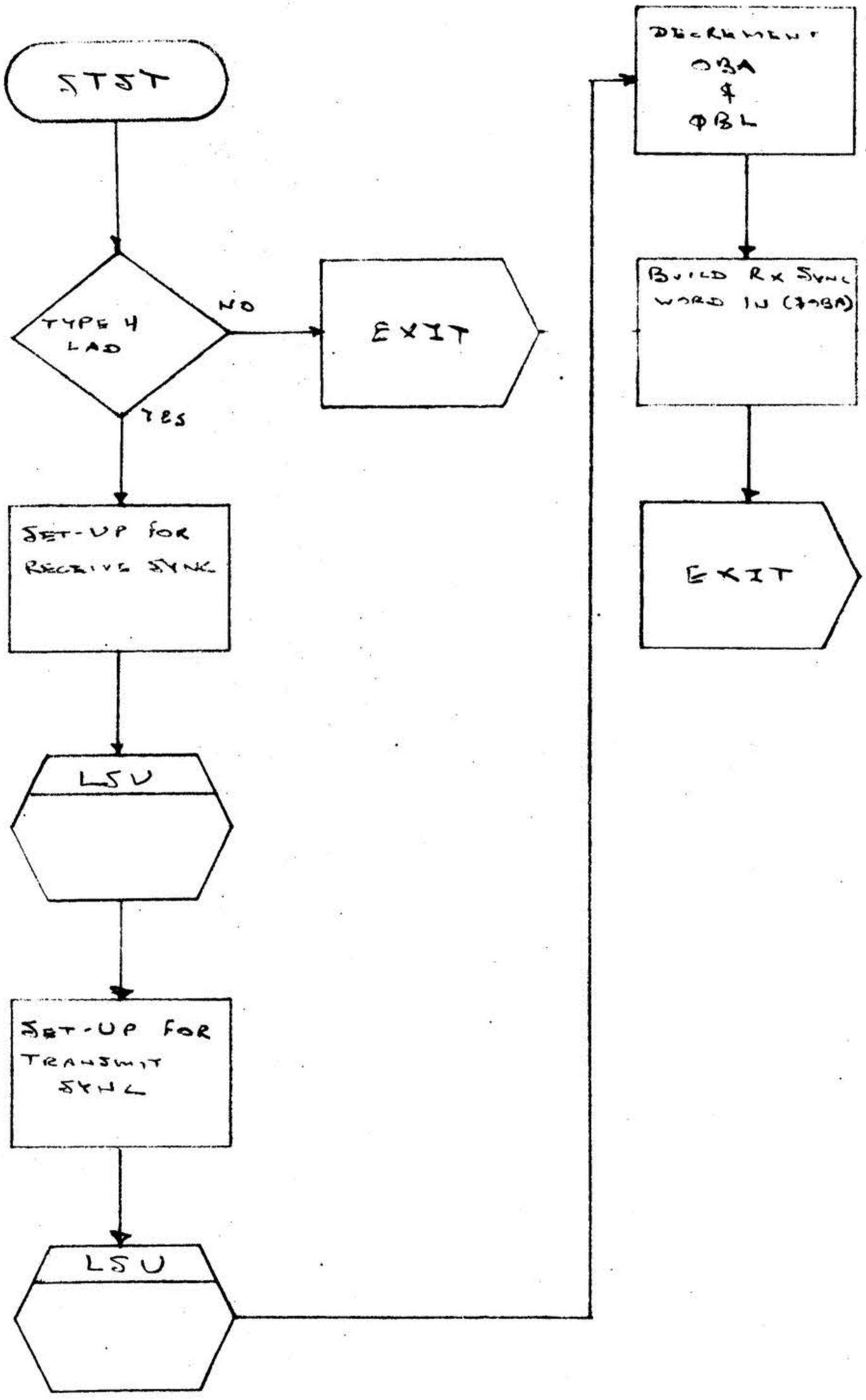
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 366 OF	A REV

98A0393-000

3.2.22 Invalid Test

Title:

Invalid Test

Symbolic Name:

NOTT

Purpose:

Entered when test does not match line adapter type.

Description:

If test 77 (burn-in) is being exercised the routine ignores the test. If not the message "NOT A VALID TEST FOR THIS LINE ADAPTER" is queued.

Entry Points:

NOTT

Calling Sequence:

```
JMP   NOTT
```

Tables or Files Modified or Read:

TEST

Tables or Files Created:

None

Called By Other Routines:

Most tests.

Called From This Routine:

QUE

Exception and/or Error Conditions:

None

Timing:

Not applicable

Size:

$36_{(8)}$ words

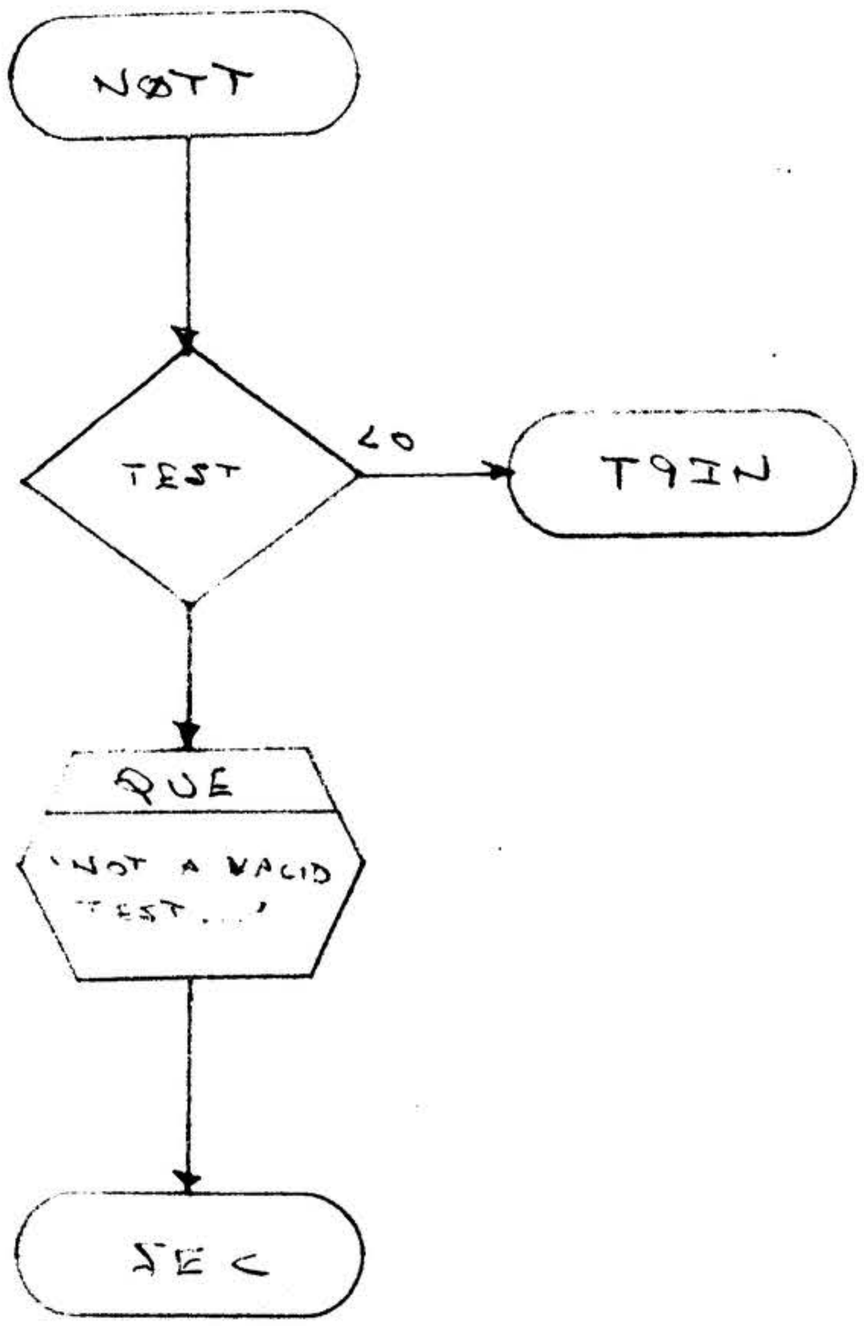
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-69 OF	A REV

3.2.23 Control Character Detected Interrupt

Title:

Control Character Detected Interrupt

Symbolic Name:

CCD

Purpose:

To process control character causing the interrupt is checked against the left and right byte of word 3 of the LCB. If a match is made, indicator ITYP is set negative and bit 4 is set.

Entry Points:

CCD

Calling Sequence:

JMP CCD on CC detected.

Tables or Files Modified or Read:

LCB (3), ITYP

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

ZTO

Exception and/or Error Conditions:

None

Timing:

Not applicable

Size:

$31_{(8)}$ words

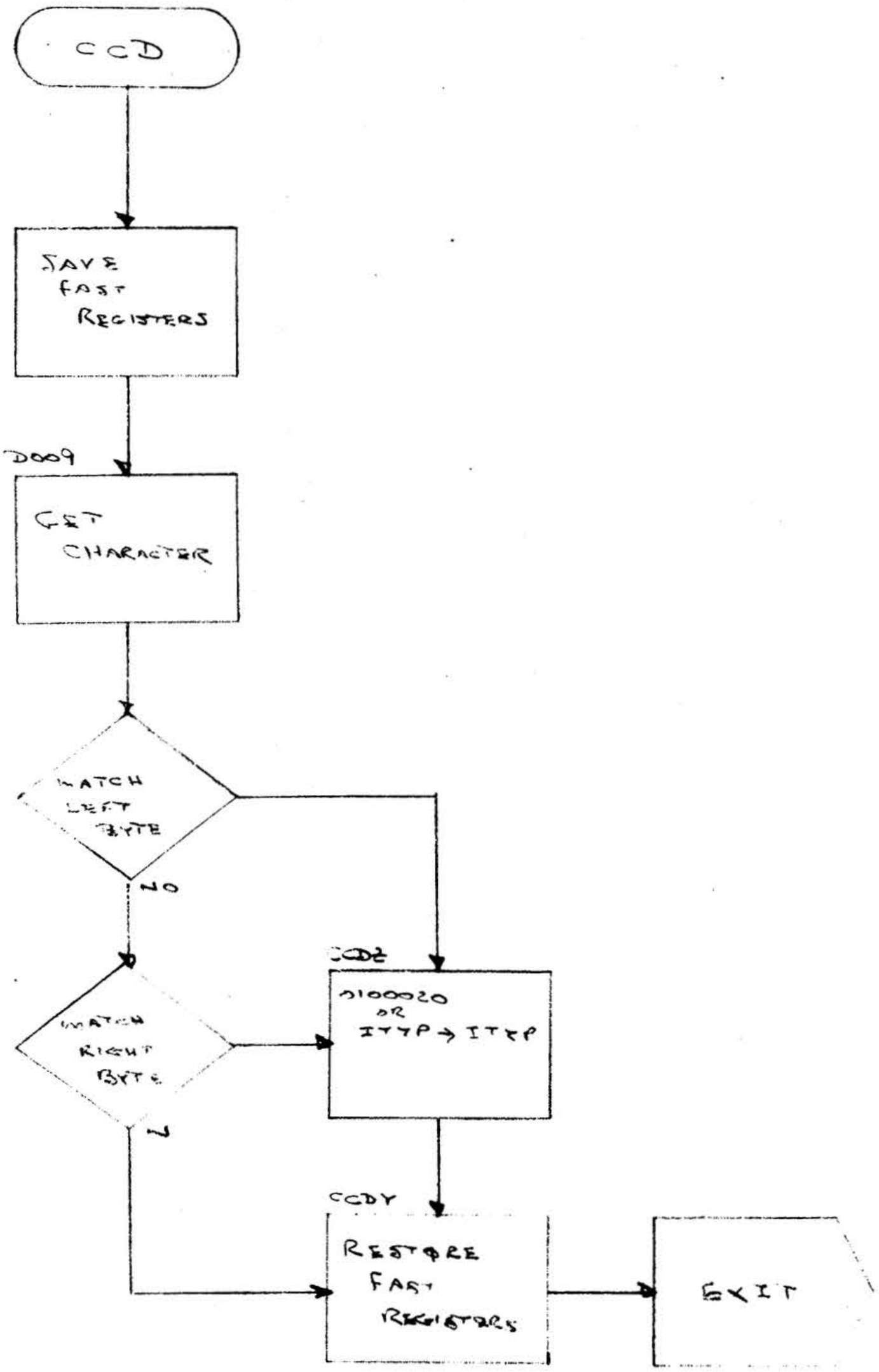
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-72 OF	A REV

96A0393-000

3.2.24 Input Byte Count Zero Interrupt

Title:

Input Byte Count Zero Interrupt

Symbolic Name:

IBCZ

Purpose:

To process input byte count zero interrupts.

Description:

The line control byte set to B, the input buffer address is reduced by 128, the complete address set for data compare, and bits 0 and 15 of ITYP are set.

Entry Points:

IBCZ

Calling Sequence:

JMPM IBCZ on input byte count zero.

Tables or Files Modified or Read:

$CMP, LCB, ITYP

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

ZTO

Exception and/or Error Conditions:

None

Timing:

Not applicable

Size:

$42_{(8)}$ words

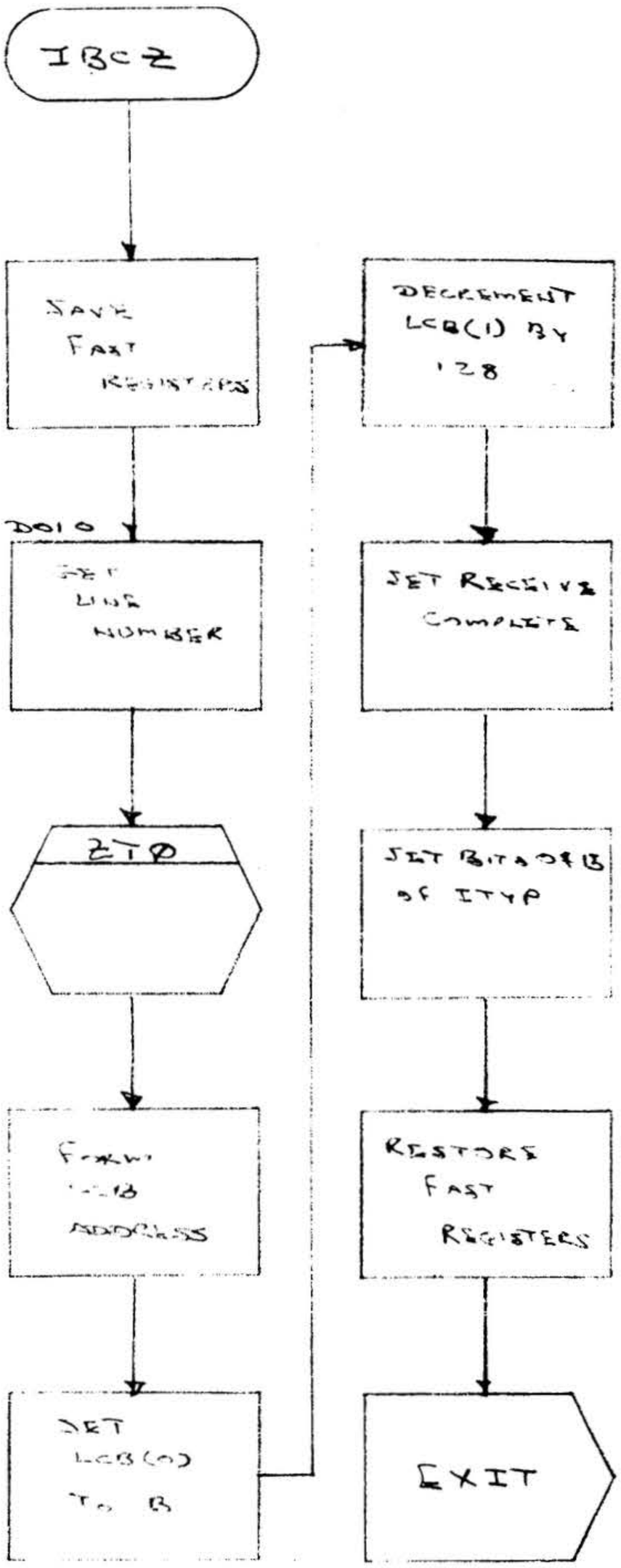
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-75OF	A REV

96A0393-000

3.2.25 Input Byte Count Zero Error

Title:

Input Byte Count Zero Error

Symbolic Name:

IERR

Purpose:

To process an undesired input byte count zero interrupt.

Description:

The line number of the line causing the interrupt is placed in the message 'IBCZ interrupt from line ll' and the message is placed in the queue.

Entry Points:

IERR

Calling Sequence:

JMPM IERR (by interrupt)

Tables or Files Modified or Read:

Not applicable

Tables or Files Created:

Not applicable

Called By Other Routines:

Not applicable

Called From This Routine:

ZTO, CAO, QUE

Exception and/or Error Conditions:

Not applicable

Timing (cycles):

Not applicable

Size:

$45_{(8)}$ words

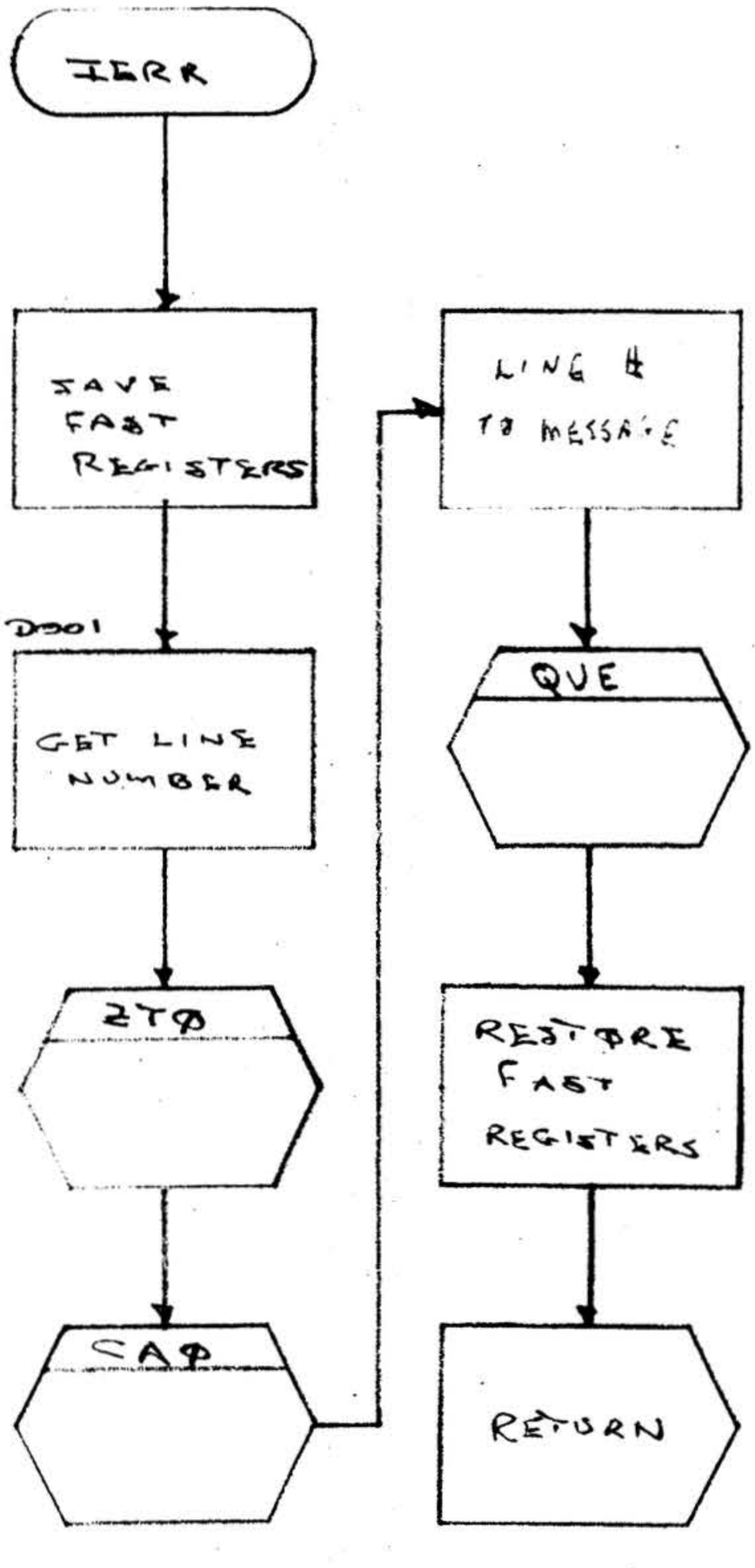
Comments:

Not applicable

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-78 OF	A REV

98A0393-000

3.2.26 Line Error

Title:

Line Error

Symbolic Name

LERR

Purpose:

To process a line error interrupt.

Description:

The line causing the interrupt and its cause is placed in the message ' Error Line ll' and the message placed in the queue. Bits 2 & 15 of ITYP are set.

Entry Points:

LERR

Calling Sequence:

JMPM LERR (by interrupt)

Tables or Files Modified or Read:

ITYP

Tables or Files Created:

Not applicable

Called By Other Routines:

Not applicable

Called From This Routine:

ZTO, CAO, QUE

Exception and/or Error Conditions:

Types of Error:

F = Framing
P = Parity
O = Overflow
PO = Parity and Overflow

Timing:

Not applicable

Size:

$72_{(8)}$ words

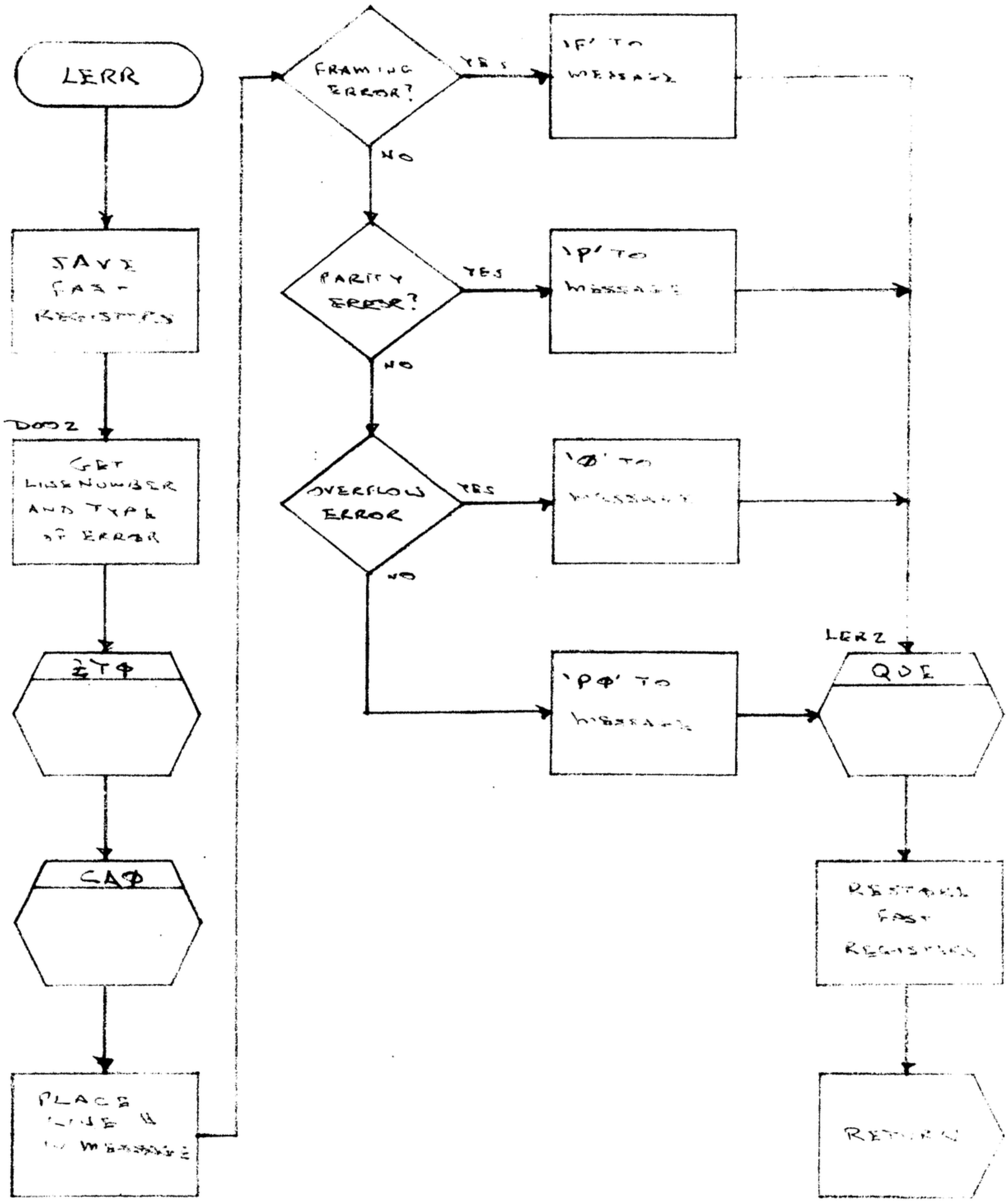
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-8 / OF	A REV

96A0393-000

3.2.27 Control

Title:

Control

Symbolic Name:

CNTL

Purpose:

To process a control interrupt as requested by LSU or RLS

Description:

The routine checks to see if it should read line status or line set-up and processes accordingly, bits 5 & 15 of ITYP are set.

Entry Points:

CNTL

Calling Sequence:

JMPM CNTL (by interrupt)

Tables or Files Modified or Read:

CONF, RSLO LCB( ), & LSUO

Tables or Files Created:

Not applicable

Called By Other Routines:

Not applicable

Called From This Routine:

Not applicable

Exception and/or Error Conditions:

None

Timing:

Not applicable

Size:

$36_{(8)}$ words

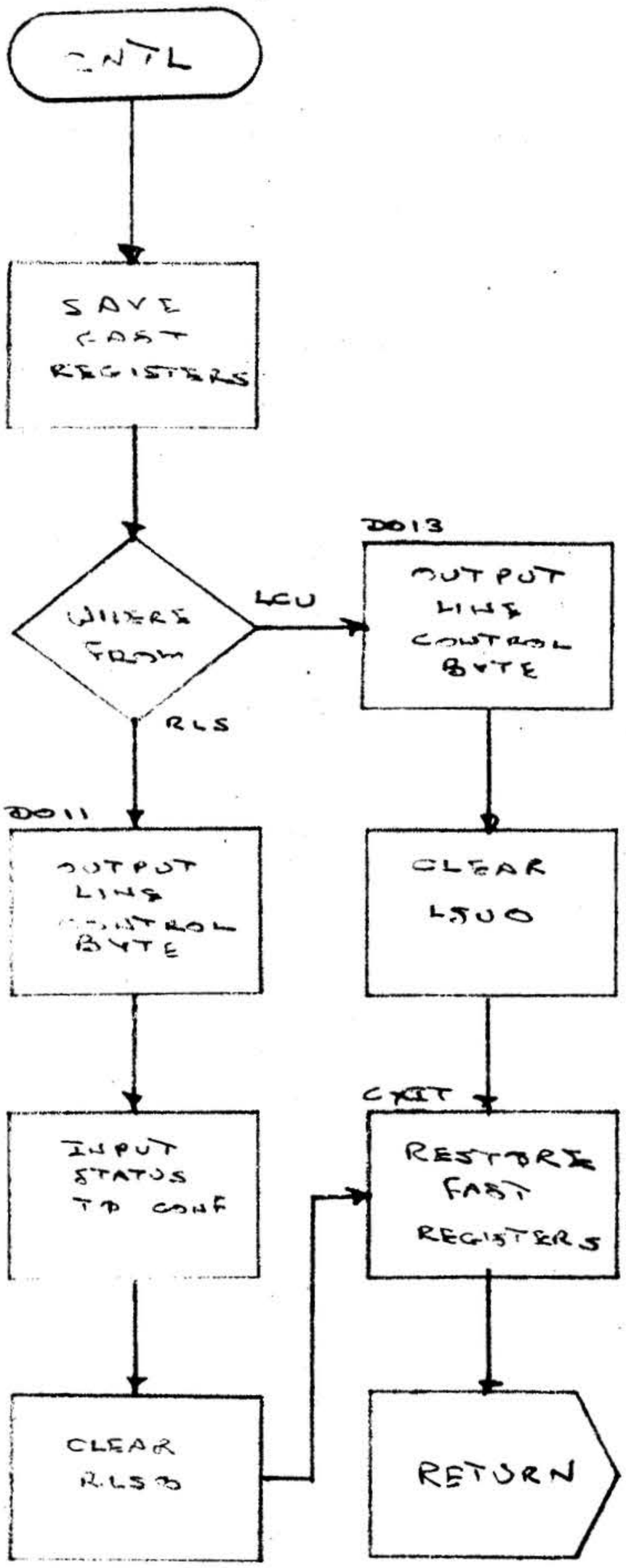
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256	A
			SH 3-84 OF	REV

96A0393-000

3.2.28 Output Byte Count Zero 2

Title:

Output Byte Count Zero 2

Symbolic Name:

OBC2

Purpose:

To process an output byte count zero interrupt.

Description:

The words LCB(4) and LCB(5) are reset to enable the line to transmit continuously, bits 1 & 15 of ITYP are set.

Entry Points:

OBC2

Calling Sequence:

JMPM OBC2 (by interrupt)

Tables or Files Modified or Read:

LCB(4), LCB(5), ITYP

Tables or Files Created:

Not applicable

Called By Other Routines:

Not applicable

Called From This Routine:

ZTO

Exception and/or Error Conditions:

None

Timing:

Not applicable

Size:

$26_{(8)}$ words

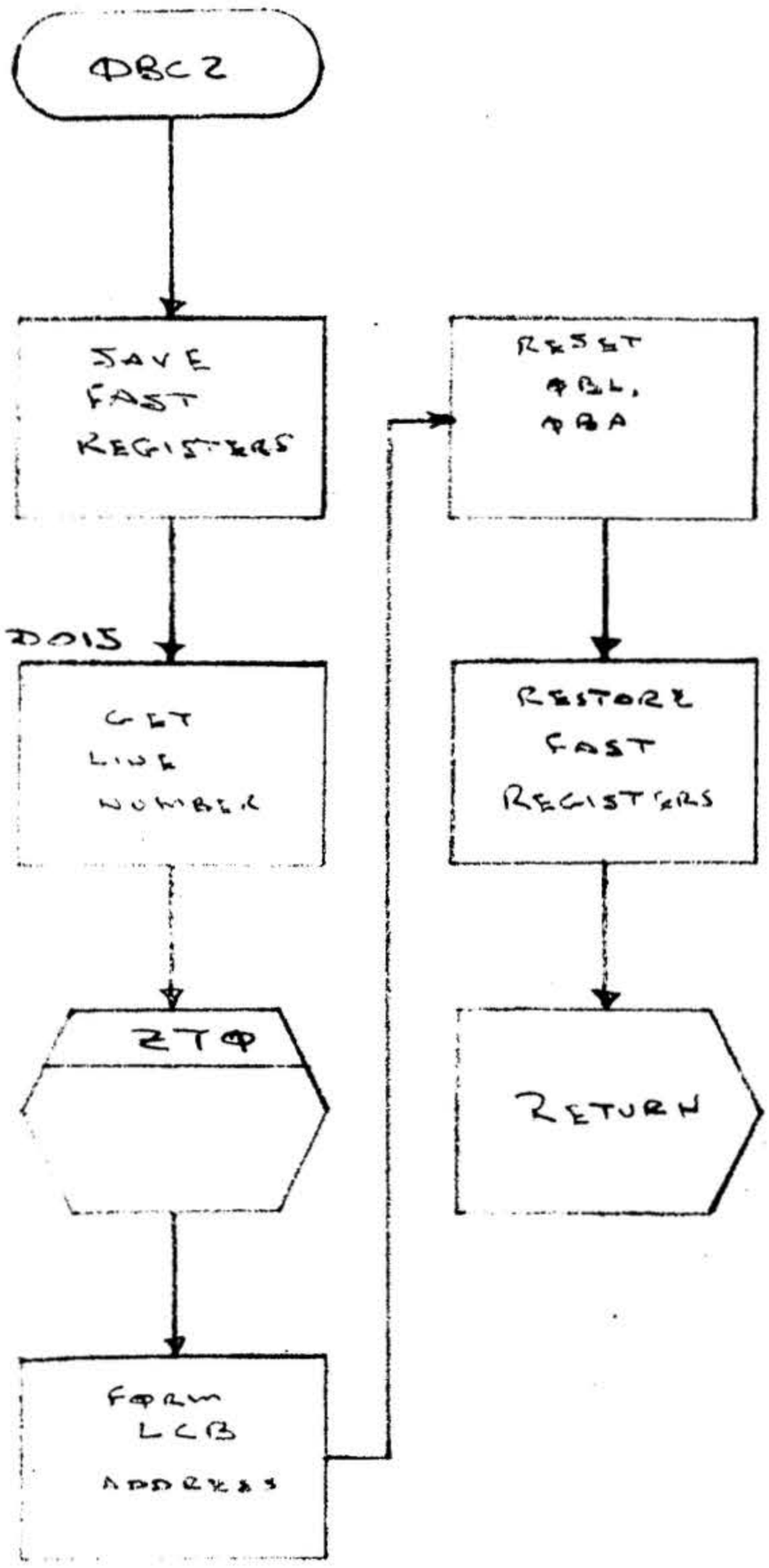
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-87 OF	A REV

96A0393-000

3.2.29 Output Byte Count Zero

Title:

Output Byte Count Zero

Symbolic Name:

OBCZ

Purpose:

To process an output byte count zero interrupt.

Description:

The word LCB(5) is reset to $OBA, bits 1 & 15 of ITYP are set.

Entry Points:

OBCZ

Calling Sequence:

JMPM OBC2 (by interrupt)

Tables or Files Modified or Read:

LCB(5), ITYP

Tables or Files Created:

Not applicable

Called By Other Routines:

Not applicable

Called From This Routine:

ZTO

Exception and/or Error Conditions:

None

Timing (cycles):

Not applicable

Size:

$27_{(8)}$ words

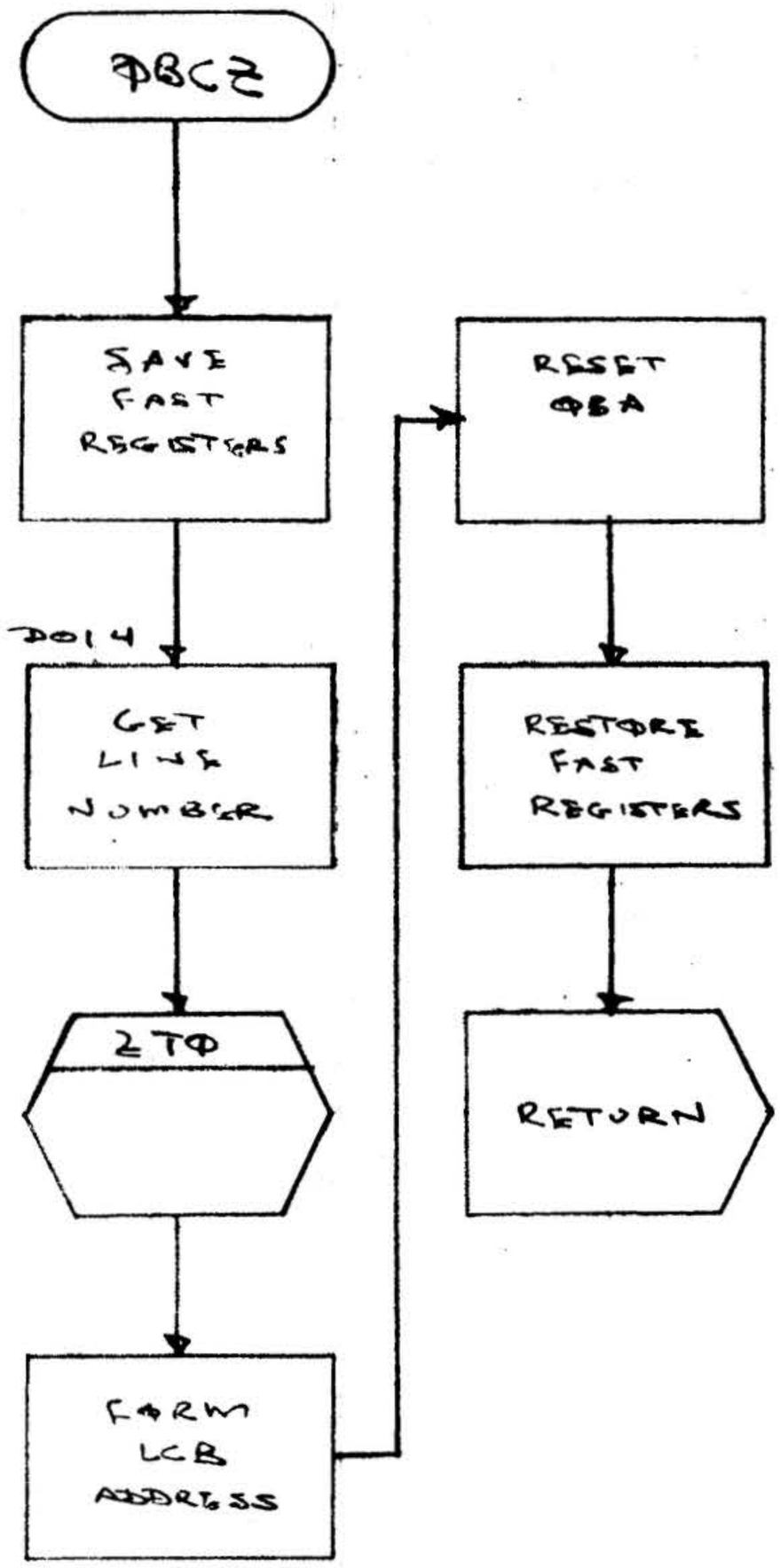
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-90 OF	A REV

98A0393-000

3.2.30 Status Change Error

Title:

Status Change Error

Symbolic Name:

SCER

Purpose:

To process an undesired status change interrupt.

Description:

The line number causing the interrupt and its octal status are placed in the message 'SC interrupt from line ll ss', and the message is placed in the queue.

Entry Points:

SCER

Calling Sequence:

JMPM SCER (by interrupt)

Tables or Files Modified or Read:

None

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

ZTO, CAO, QUE

Exception and/or Error Conditions:

None

Timing (cycles):

Not applicable

Size:

$61_{(8)}$ words

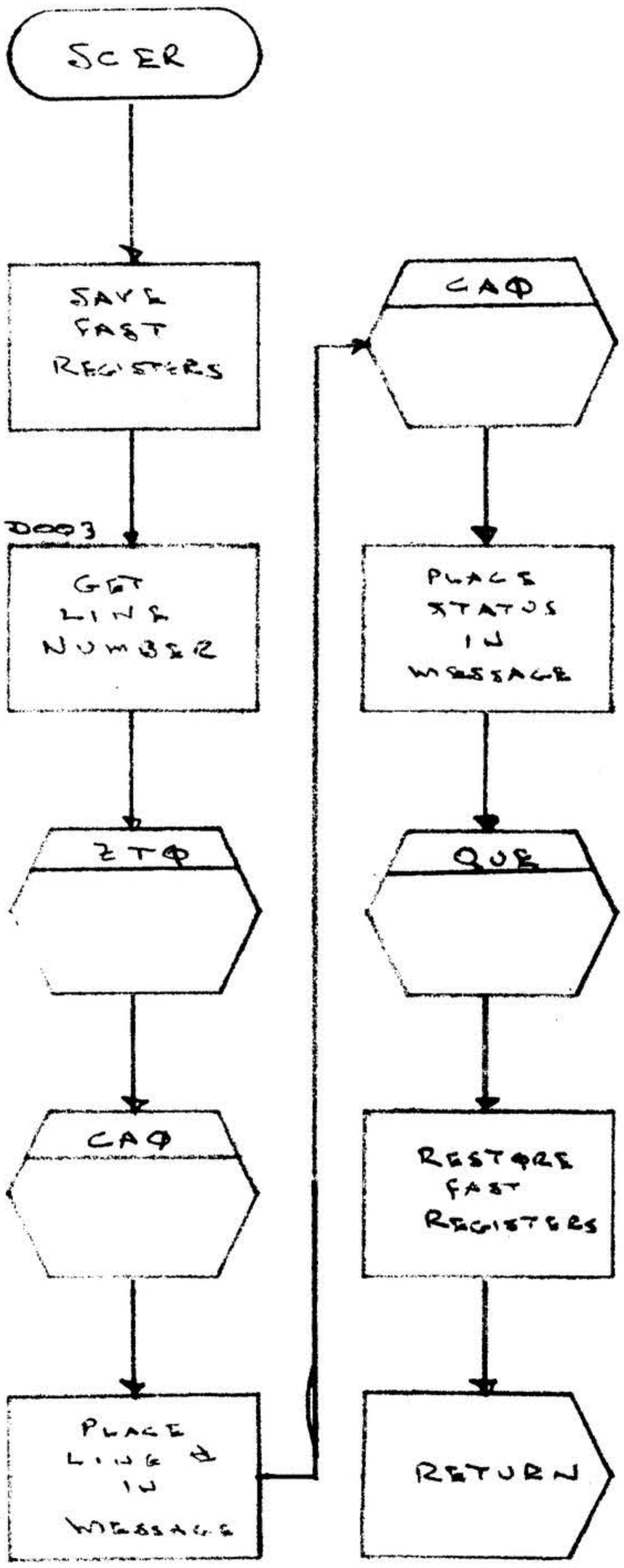
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-93 OF	A REV

96A0393-000

3.2.31 Ignore Interrupt

Title:

Ignore Interrupt

Symbolic Name:

CCDI, IBZI, OBZI, CCER

Purpose:

To process an interrupt and ignore it.

Description:

An input command is issued to the DCM and ignored.

Entry Points:

CCER

Calling Sequence:

JMPM CCER (by interrupt)

Tables or Files Modified or Read:

None

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

None

Exception and/or Error Conditions:

None

Timing (cycles):

Not applicable

Size:

5 words

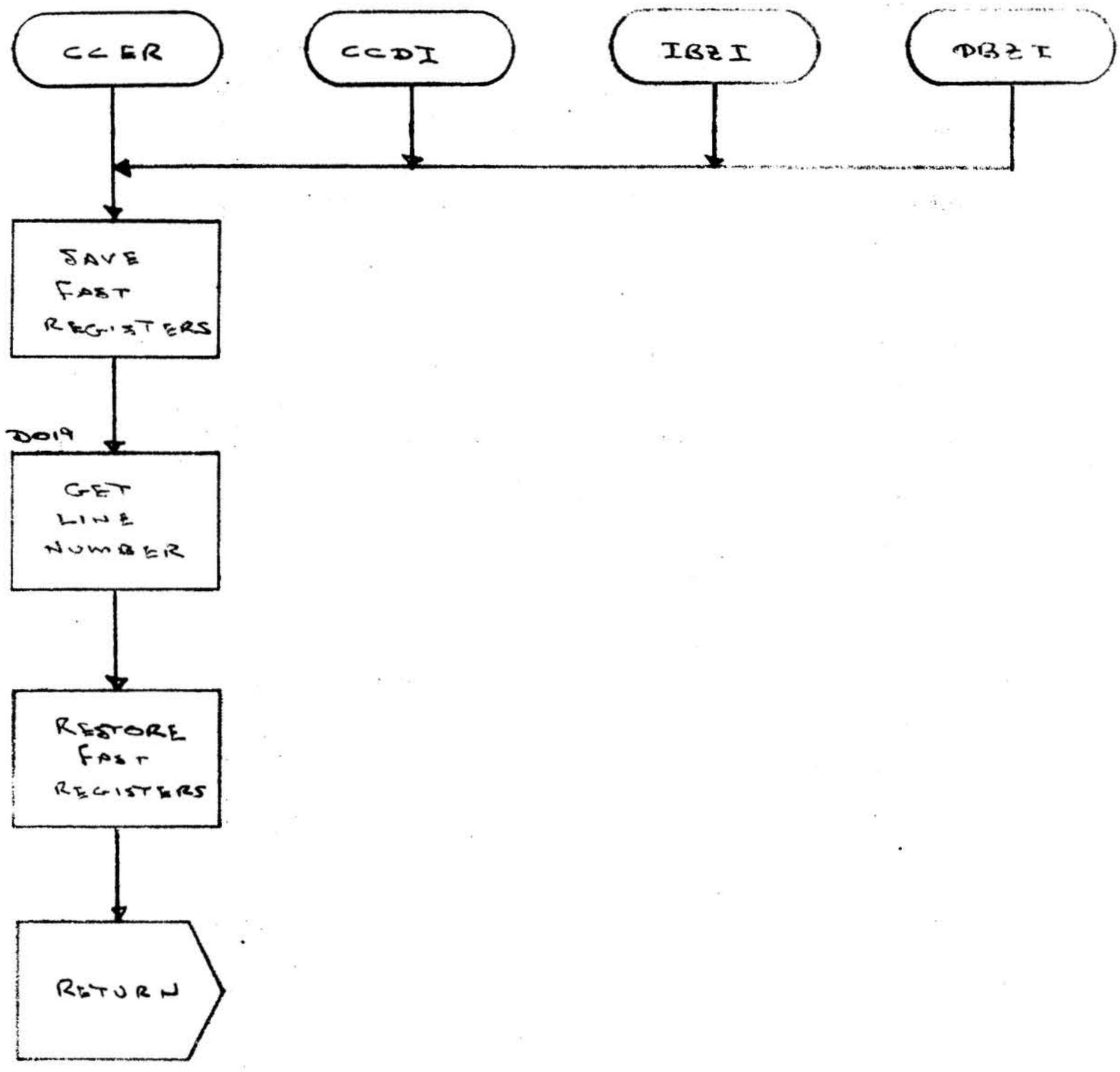
Comments:

CCDI, IBZI, & OBZI are equated to CCER.

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-96 OF	A REV

98A0393-000

3.2.32 Input Byte Count Zero 3

Title:

Input Byte Count Zero 3

Symbolic Name:

IBC3

Purpose:

To process an input byte count zero interrupt and invert the S bit for test 3.

Description:

The word LCB(1) is reset, bit 15 of LCB(6) is inverted, and bit 8 of LCB(6) is set. Bits 0 & 15 of ITYP are set.

Entry Points:

IBC3

Calling Sequence:

JMPM IBC3 (by interrupt)

Tables or Files Modified or Read:

LCB(1), LCB(6), ITYP, $CMP

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

ZTO

Exception and/or Error Conditions:

None

Timing (cycles):

Not applicable

Size:

$42_{(8)}$ words

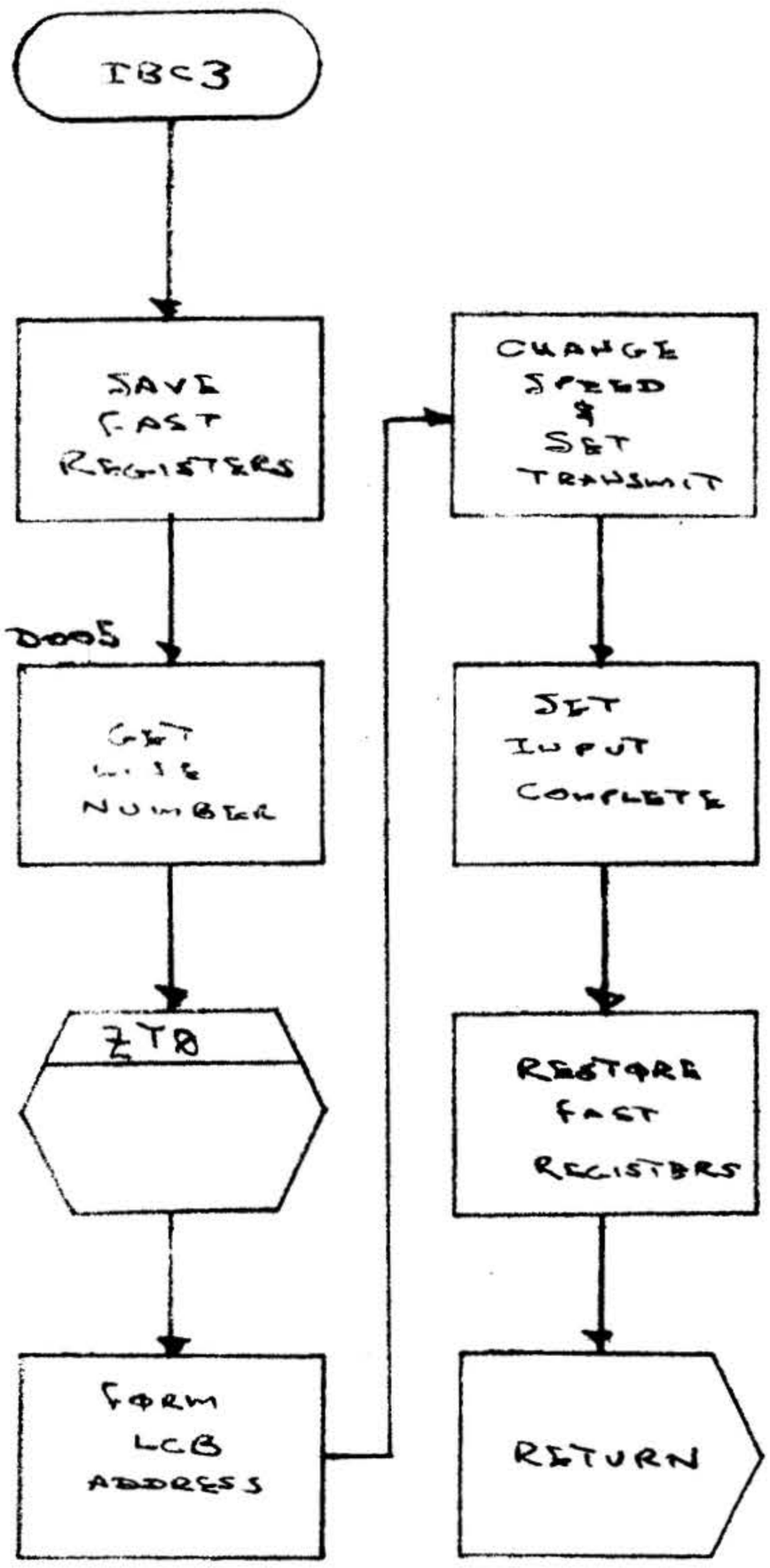
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH3-99 OF	A REV

96A0393-000

3.2.33 Output Byte Count Zero 3

Title:

Output Byte Count Zero 3

Symbolic Name:

OBC3

Purpose:

To process an output byte count zero interrupt for test 3.

Description:

Word LCB(5) is reset to $OBA, bit 8 of LCB(6) is reset, and bits 1 & 15 of ITYP are set.

Entry Points:

OBC3

Calling Sequence:

JMPM OBC3 (by interrupt)

Tables or Files Modified or Read:

LCB(5), LCB(6) ITYP

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

ZTO

Exception and/or Error Conditions:

None

Timing (cycles):

Not applicable

Size:

$34_{(8)}$ words

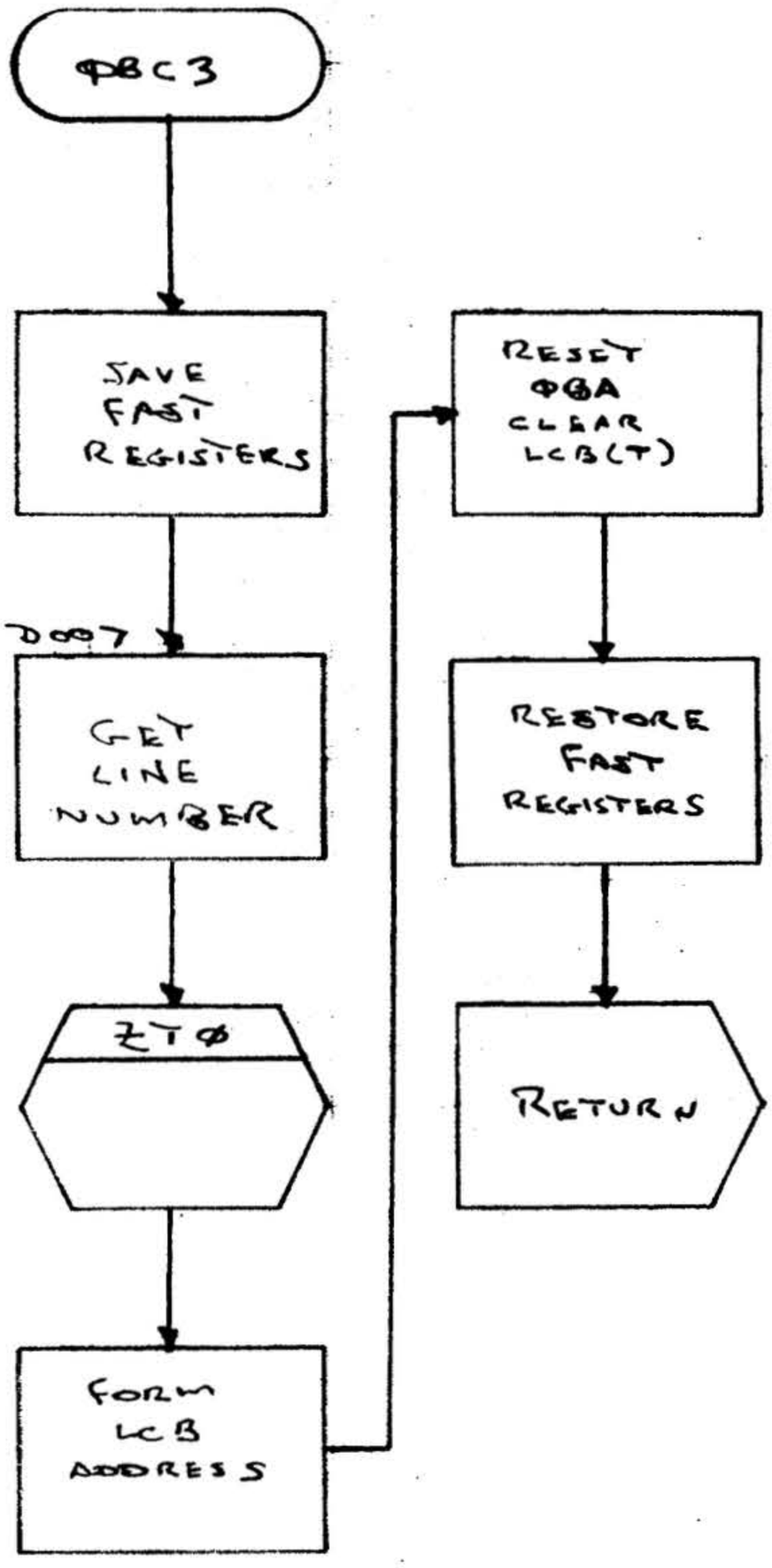
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3/102 OF	A REV

3.2.34 Line Error (Break)

Title:

Line Error (Break)

Symbolic Name:

LERB

Purpose:

To process a line error interrupt and look specifically for break.

Description:

The interrupting line is tested for break and correct line number, bits 4, 9 & 15 of ITYP are set.

Entry Points:

LERB

Calling Sequence:

JMPM LERB (by interrupt)

Tables or Files Modified or Read:

LERR, ITYP

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

ZTO, LERR

Exception and/or Error Conditions:

Subroutine LERR is used to decode line errors other than break.

Timing (cycles):

Not applicable

Size:

$42_{(8)}$ words

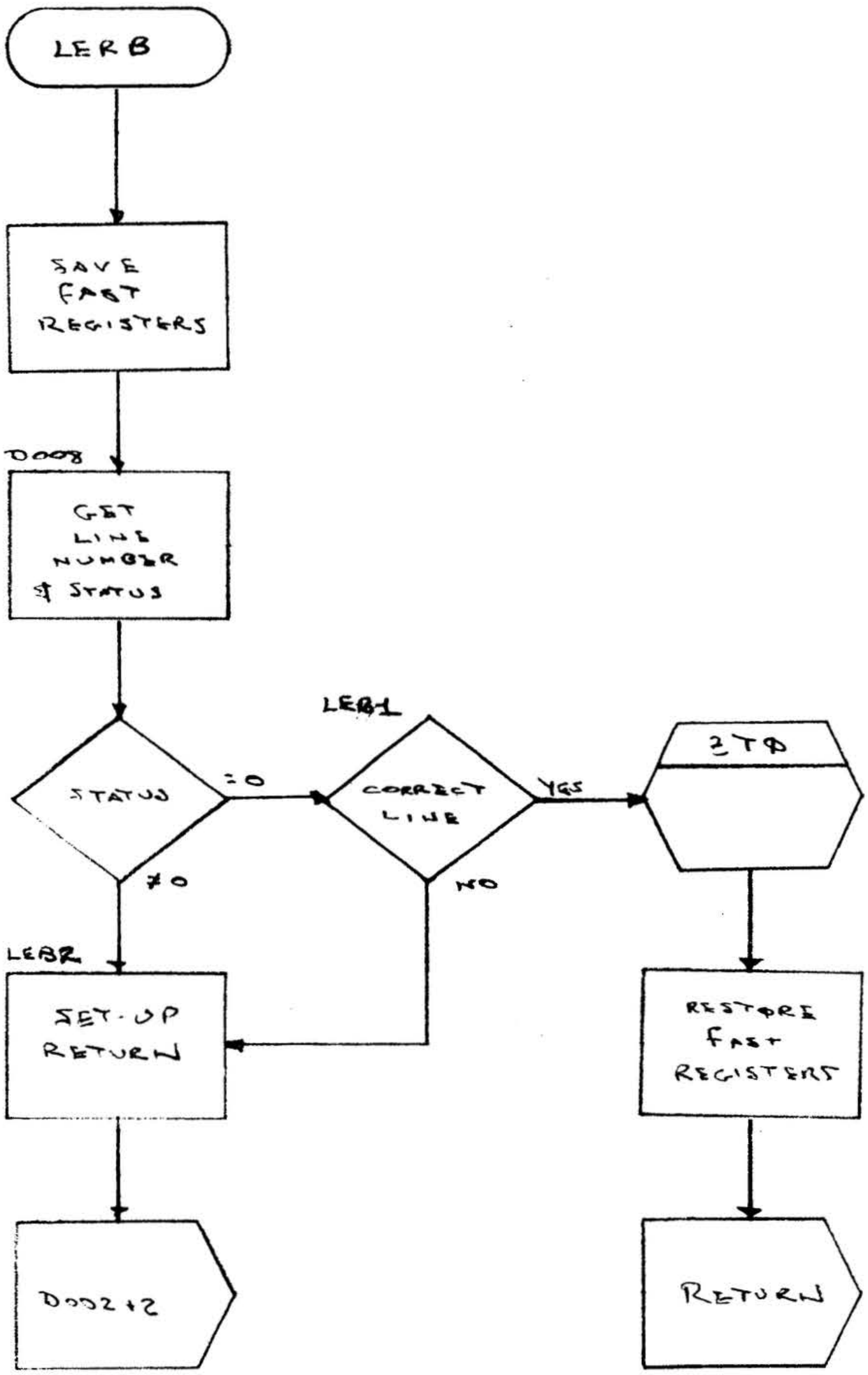
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-105 OF	A REV

96A0393-000

3.2.35 Line Error (Ignore)

Title:

Line Error (Ignore)

Symbolic Name:

LERI

Purpose:

To ignore a line error interrupt from the proper line.

Description:

If the interrupt is from the proper line, bits 2 & 15 of ITYP are set. If not, the line number is placed in the message 'line error interrupt from line ll', and message is placed in the queue.

Entry Points:

LERI

Calling Sequence:

JMPM LERI (by interrupt)

Tables or Files Modified or Read:

CAL, ITYP

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

ZTO, CAO, QUE

Exception and/or Error Conditions:

None

Timing:

Not applicable

Size:

$66_{(8)}$ words

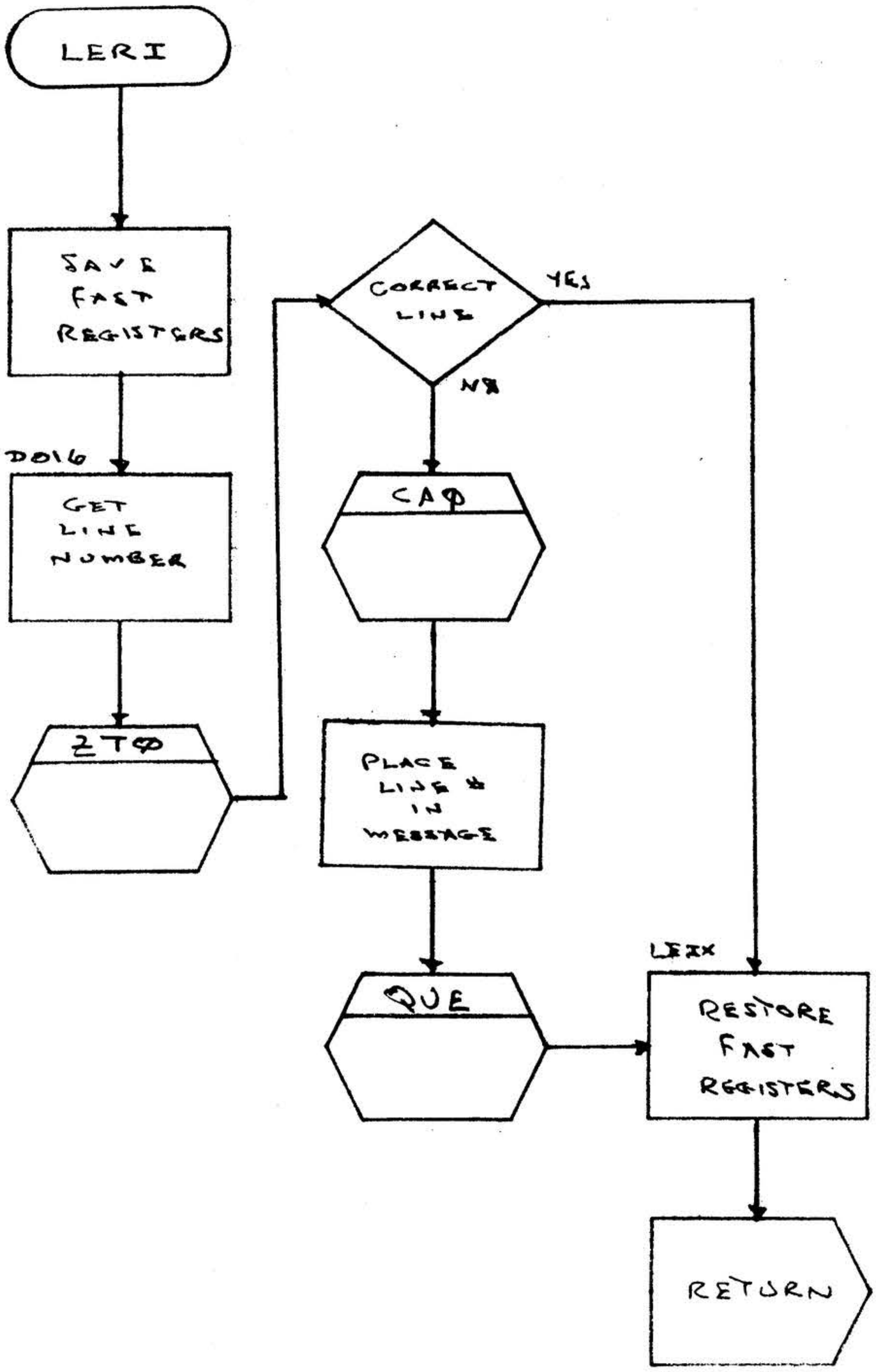
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-108 OF	A REV

Exception and/or Error Conditions:

None

Timing:

Not applicable

Size:

$50_{(8)}$ words

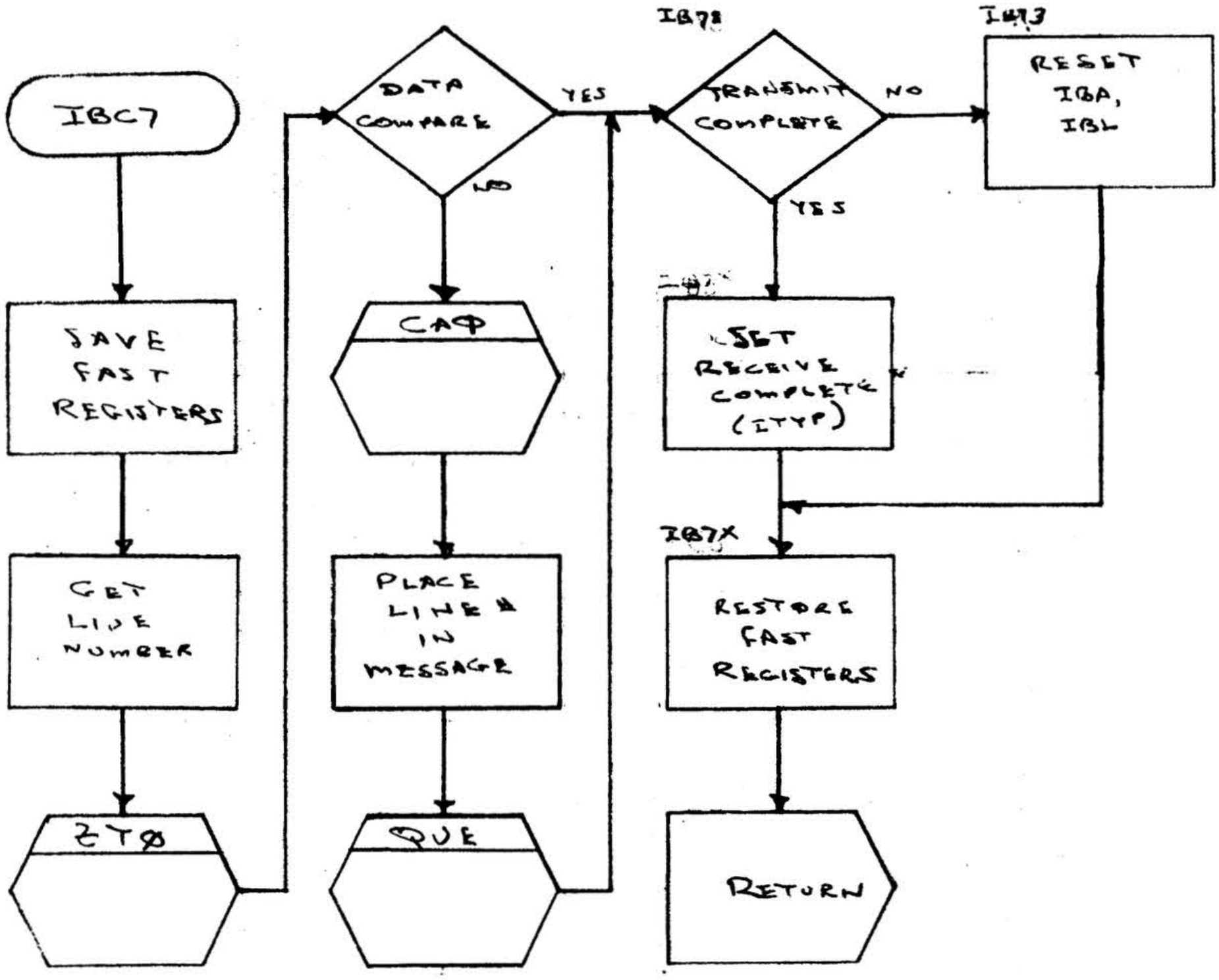
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-111 OF	A REV

98A0393-000

3.2.37 Status Change Interrupt

Title:

Status Change Interrupt

Symbolic Name:

SCI

Purpose:

To process a status change interrupt.

Description:

Bits 8 & 9 of the interrupting line and bits 3 & 15 of ITYP are set.

Entry Points:

SCI

Calling Sequence:

JMPM SCI (by interrupt)

Tables or Files Modified or Read:

ITYP

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

ZTO

Exception and/or Error Conditions:

None

Timing:

Not applicable

Size:

$31_{(8)}$ words

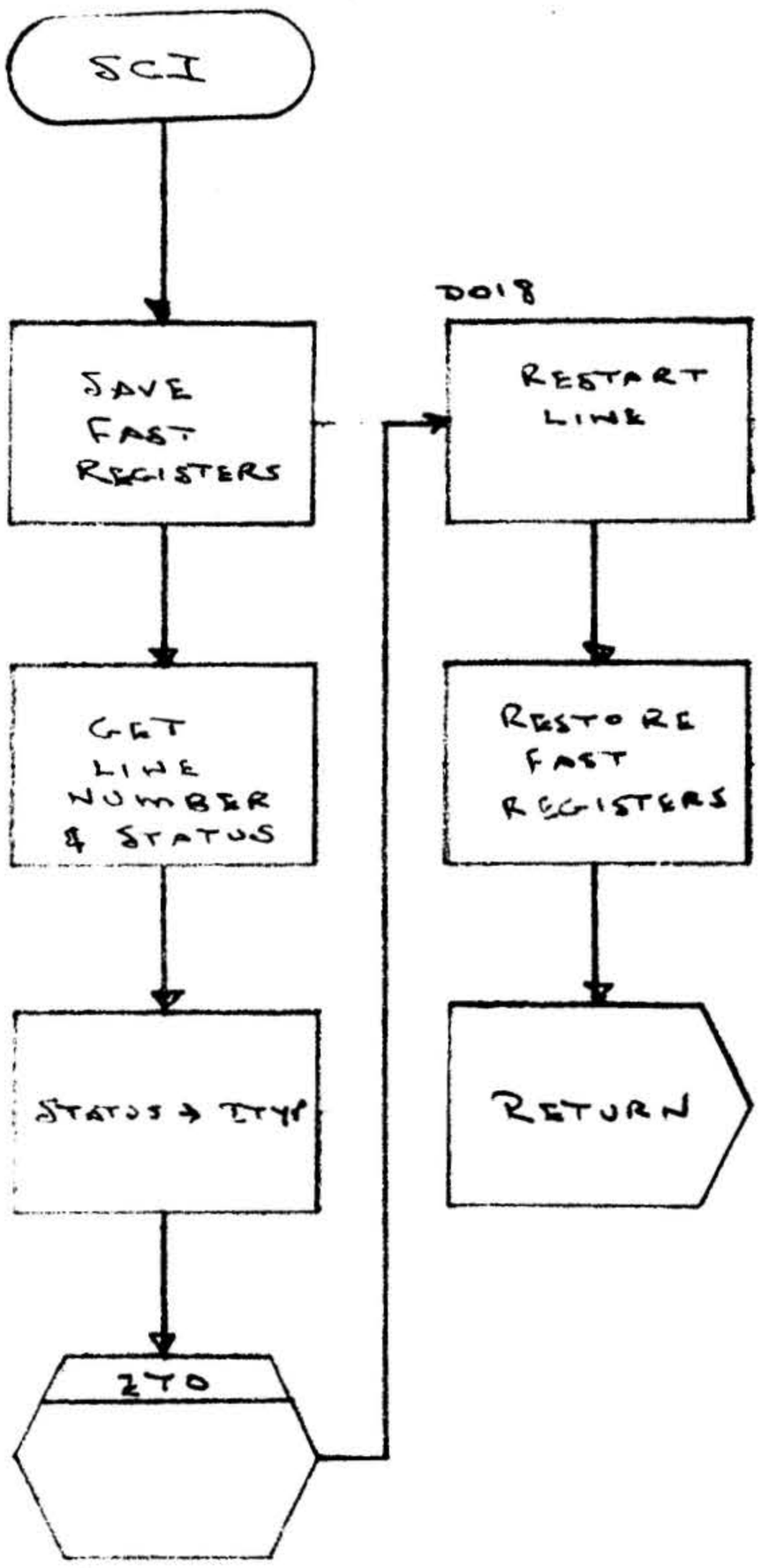
Comments:

None

Hardware Details:

Not applicable

Flowcharts:


SCI
SAVE FAST REGISTERS
GET LINE NUMBER & STATUS
STATUS → TTYP
ZTO
DOI8
RESTART LINE
RESTORE FAST REGISTERS
RETURN

3.2.38 Output Byte Count Zero (Delay)

Title:

Output Byte Count Zero (Delay)

Symbolic Name:

OBZD

Purpose:

To delay in responding to an output byte count zero interrupt to force an error condition.

Description:

Maintain II subroutines TDLT is used to provide the delay, and OBZI is used to process the interrupt.

Entry Points:

OBZD

Calling Sequence:

JMPM OBZD (by interrupt)

Tables or Files Modified or Read:

None

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

TDLY*, OBZI

*Maintain II subroutine

Exception and/or Error Conditions:

None

Timing (cycles):

Not applicable

Size:

$13_{(8)}$ words

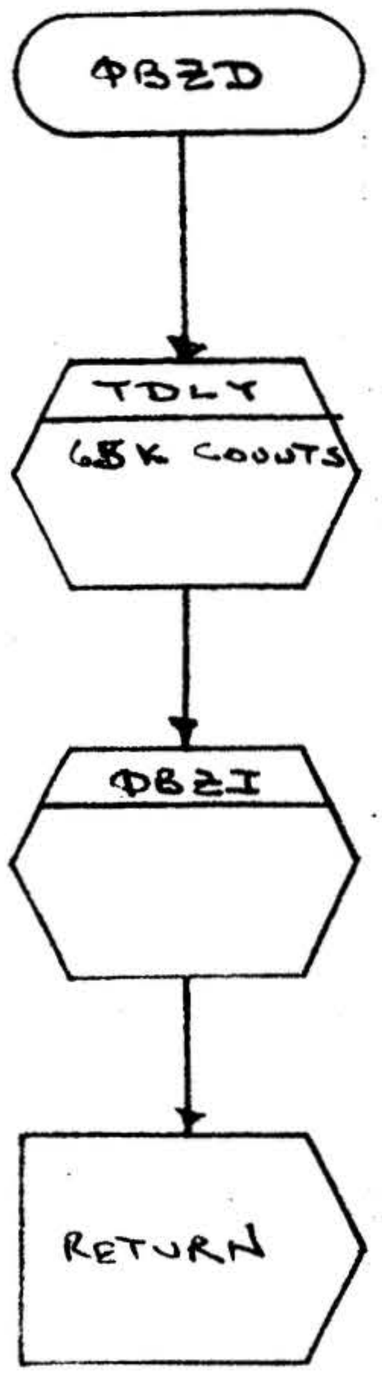
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-117 OF	A REV

3.2.39 **Test 0**

Title:

Test 0

Symbolic Name:

TST0

Purpose:

To test each active line in transmit only.

Description:

Each active line is placed in transmit and allowed to run continuously.

Entry Points:

TST0

Calling Sequence:

JMP TST0

Tables or Files Modified or Read:

LCB

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

LIB, LSU, TIMO, RLIN, UNQ

Exception and/or Error Conditions:

No count of passes is maintained.

Timing (cycles):

Not applicable

Size:

$65_{(8)}$ words

Comments:

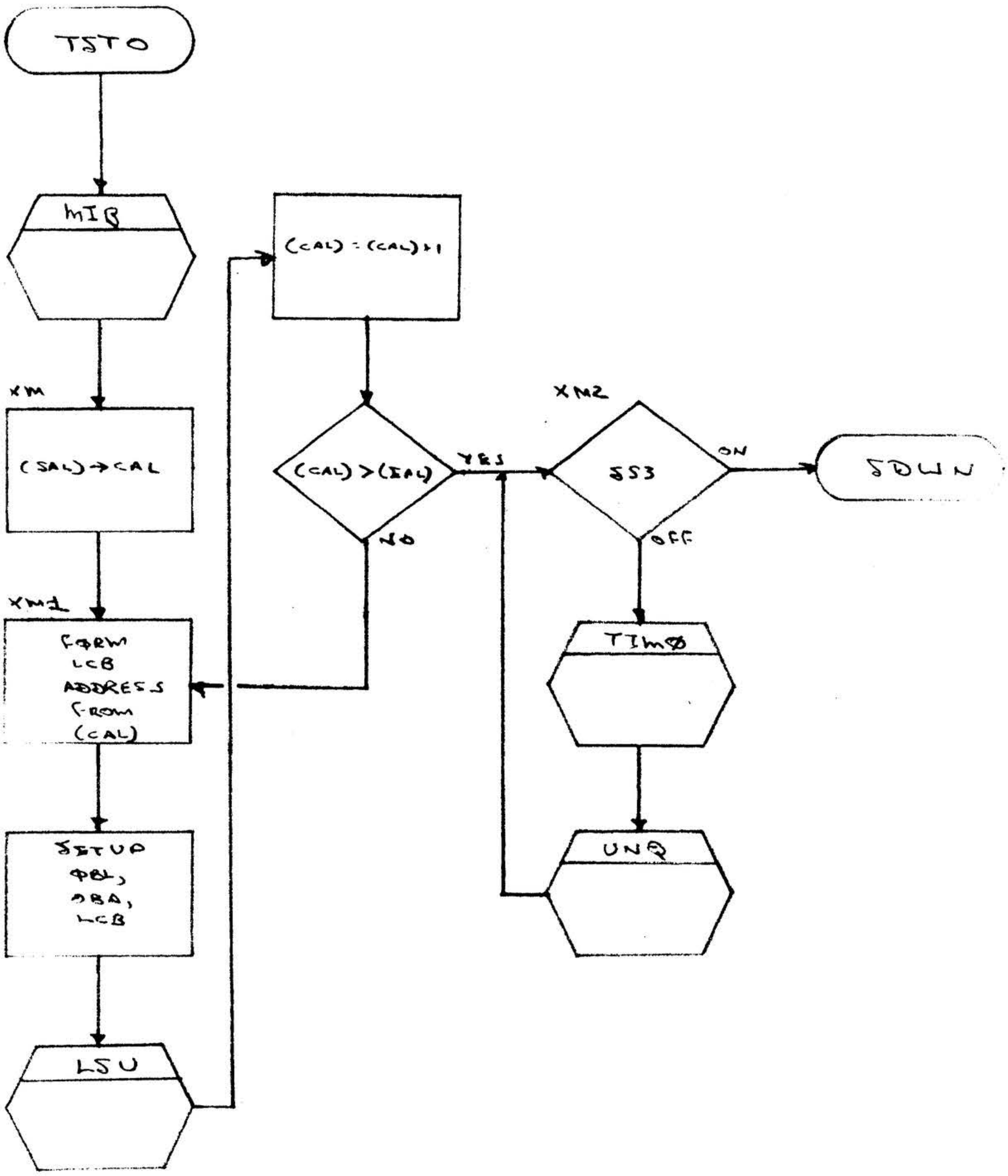
Interrupts Used

0 - IERR
1 - OBC2
2 - LERR
3 - SCER
4 - CCER
5 - CNTL

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-120 OF	A REV

96A0393-000

3.2.40 Test 1

Title:

Test 1

Symbolic Name:

TST1

Purpose:

To loop data and check for correctness.

Description:

Each active line is placed in the full duplex mode and allowed run continuously. As each line completes, the data received is checked for correctness.

Entry Points:

TST1

Calling Sequence:

JMP TST1

Tables or Files Modified or Read:

LCB, $CMP

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

MIB, AIB, STST, LSU, TIMO, RLIN, UNQ, CAO, QUE, OUTD* OUTE*

*Maintain II subroutines

Exception and/or Error Conditions:

No count of passes is maintained. The number of lines that can be tested depends on available memory.

Timing:

Not applicable

Size:

$310_{(8)}$ words

Comments:

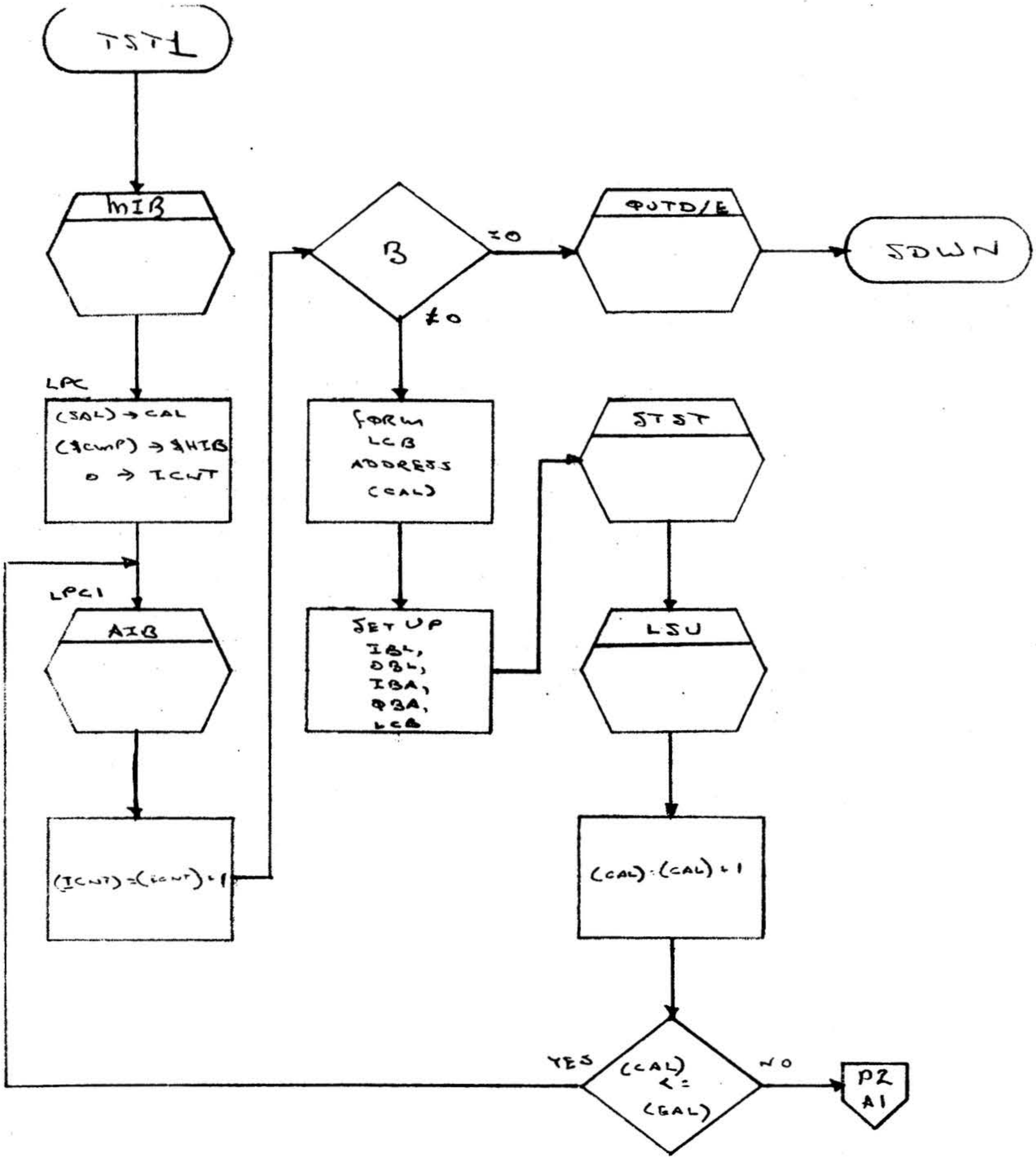
Interrupts used:

0 - IBCZ
1 - OBCZ
2 - LERR
3 - SCER
4 - CCD
5 - CNTL

Hardware Details:

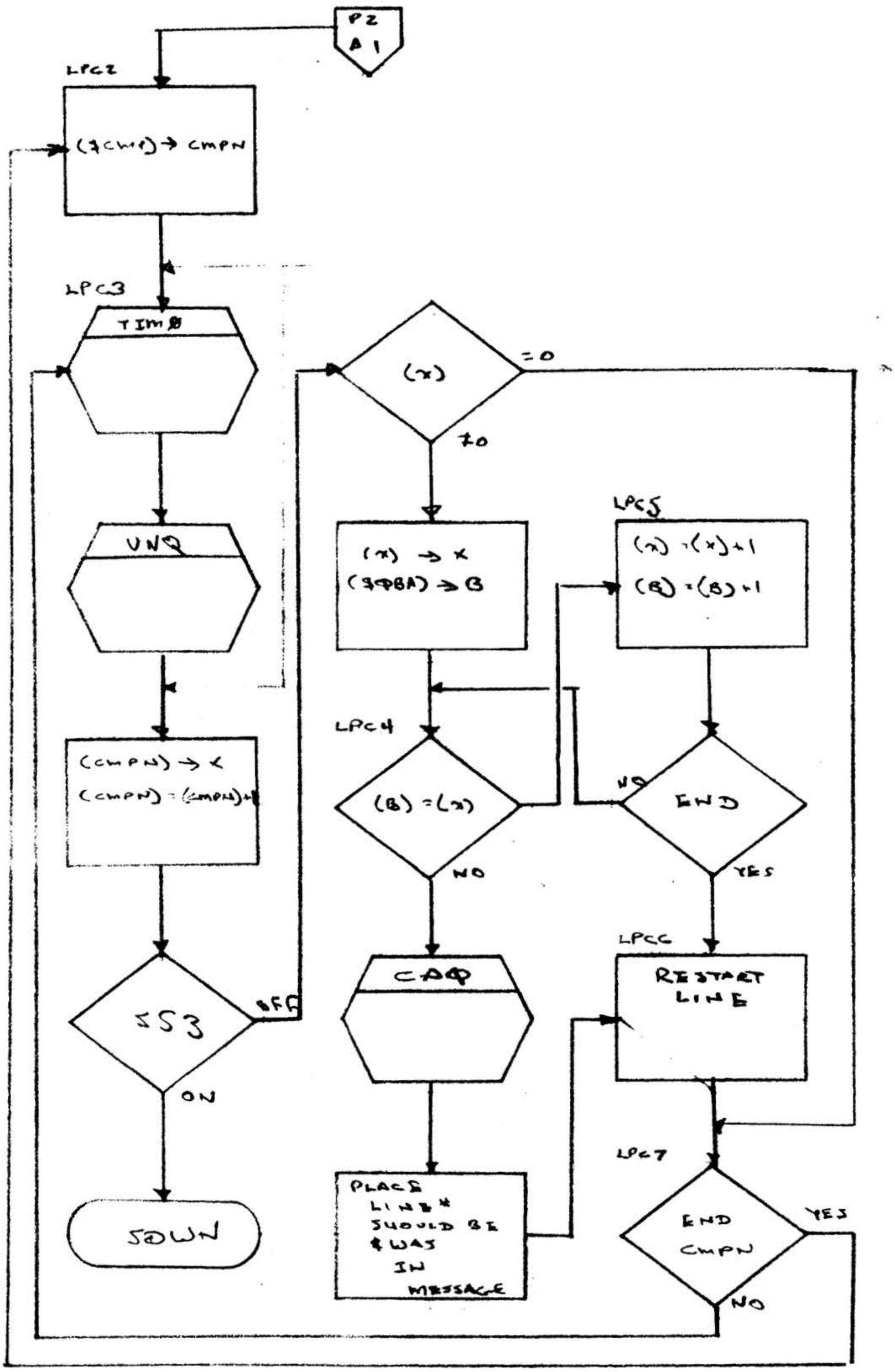
Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-123 OF	A REV

96A0393-000



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256	A
			SH 3-124 OF	REV

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3.2.41 Test 2

Title:

Test 2

Symbolic Name:

TST2

Purpose:

To test control character detected logic.

Description:

Each active line is checked for the recognition of all possible control characters (except 0). A failure will result in the message 'CCERR LINE II CC cccccc'.

Entry Points:

TST2

Calling Sequence:

JMPM TST2

Tables or Files Modified or Read:

LCB, ITYP

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

MIB, AIB, STET, LSU, TIMO, RLIN, UNQ, CAO, & QUE

Exception and/or Error Conditions:

None

Timing (cycles):

Not applicable

Size:

$236_{(8)}$ words

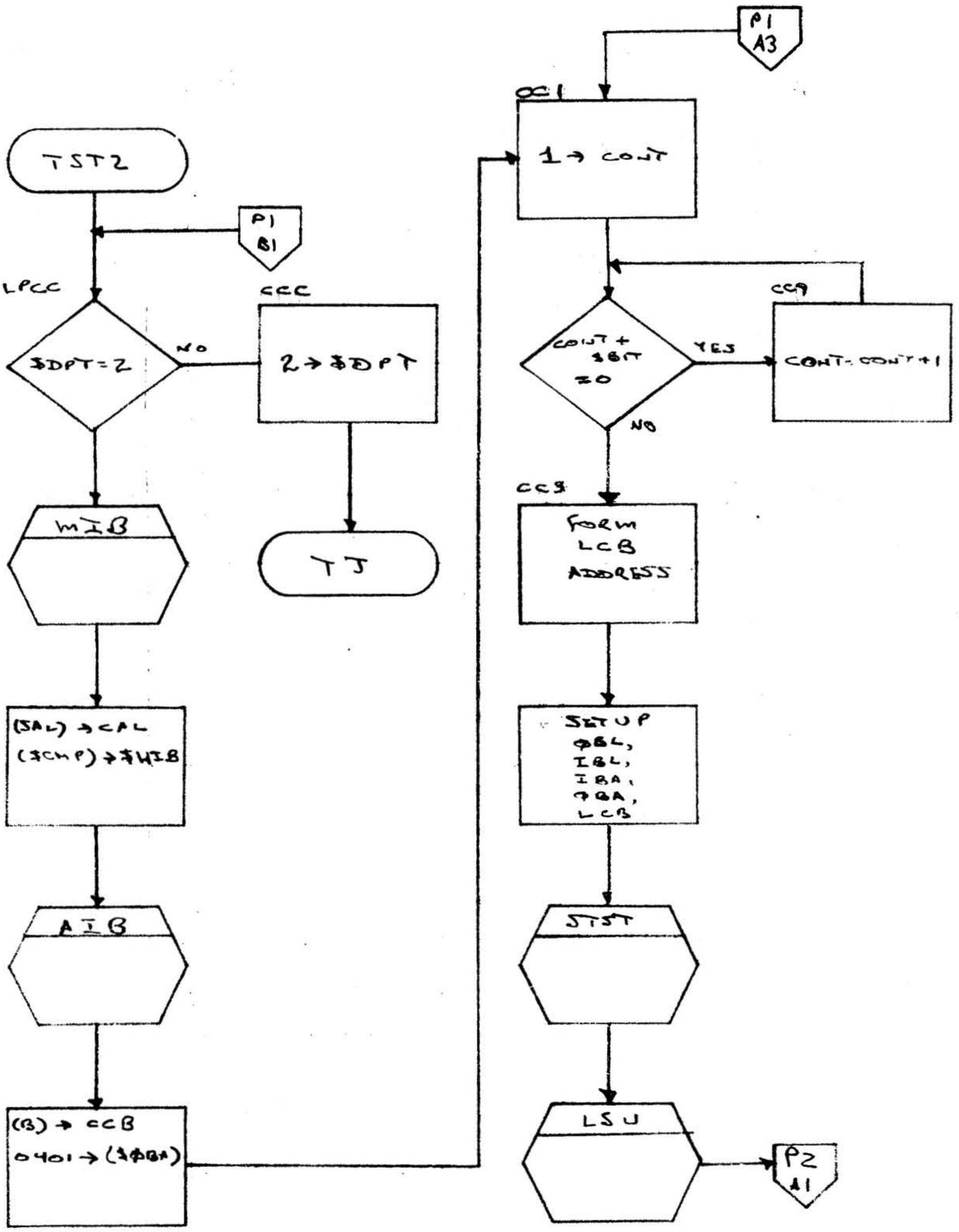
Comments:

Interrupts used are the same as Test 1.

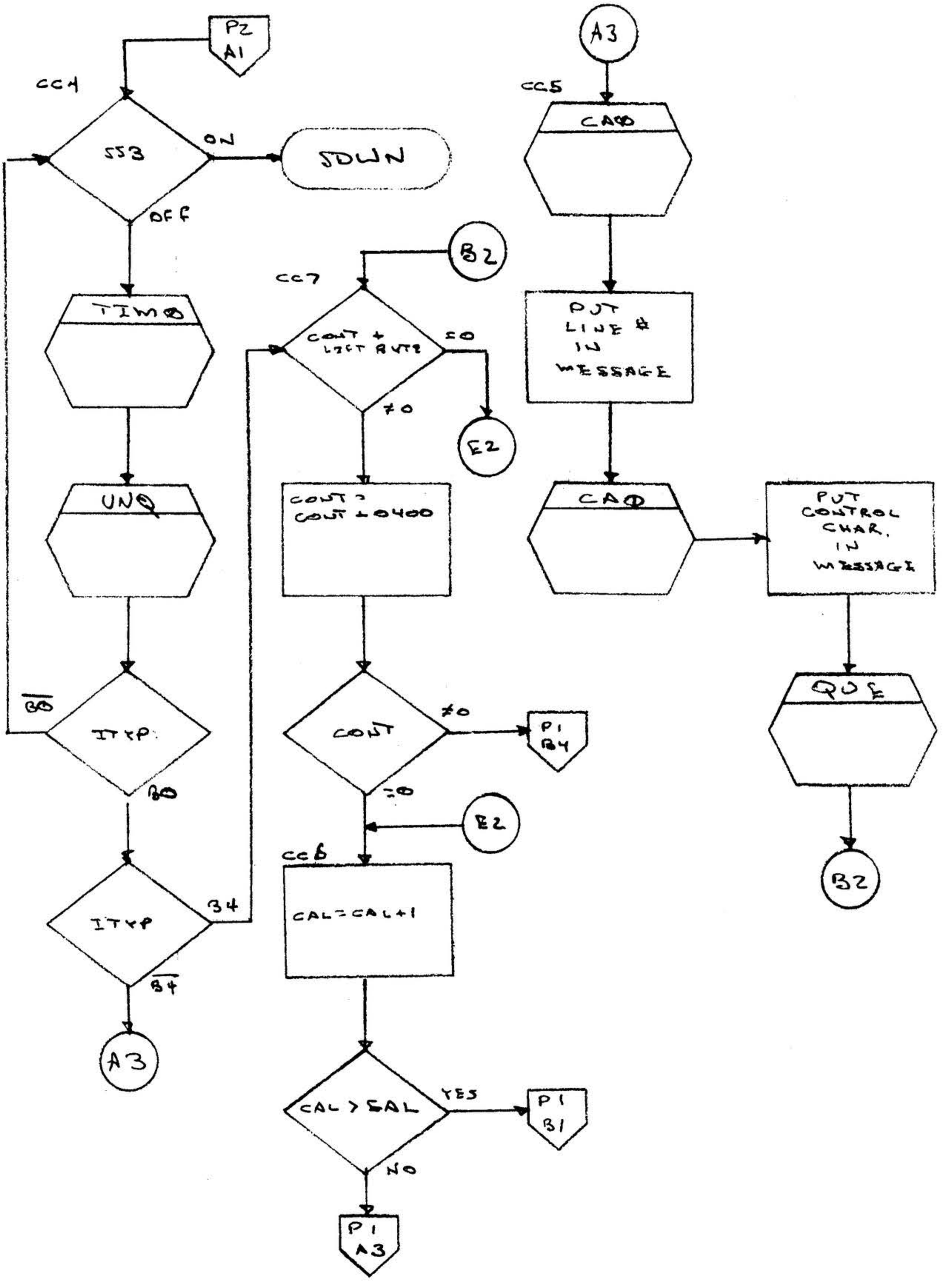
Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-127 OF	A REV



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-128 OF	A REV

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3.2.42 Test 3

Title:

Test 3

Symbolic Name:

TST3

Purpose:

To provide for speed change checking (by external means)

Description:

Uses Test 1.

Entry Points:

TST3

Calling Sequence:

JMP TST3

Tables or Files Modified or Read:

See Test 1

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

See Test 1

Exception and/or Error Conditions:

Synchronous lines may not be tested, see Test 1.

Timing (cycles):

Not applicable

Size:

$21_{(8)}$ words

Comments:

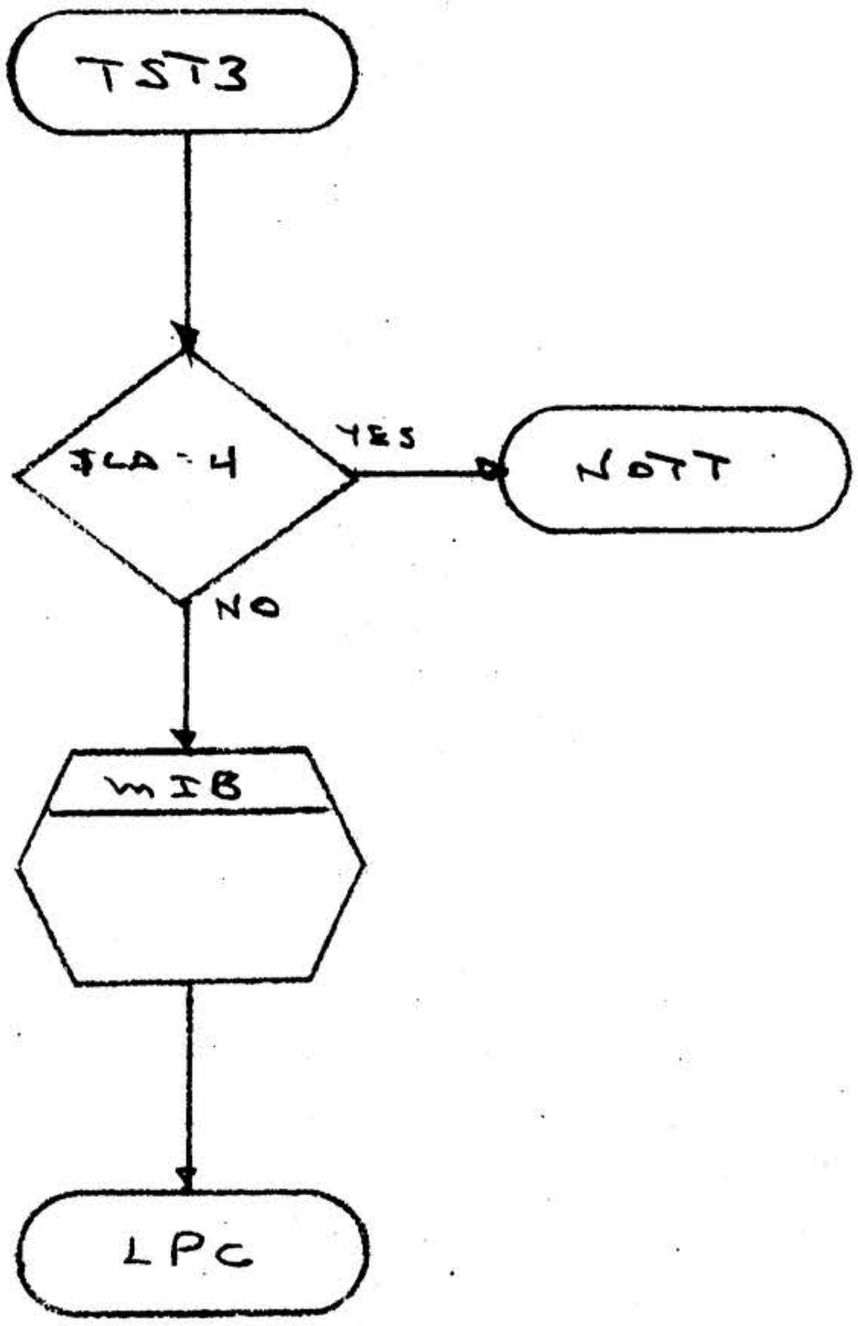
Interrupts used

0 - IBC3
1 - OBC3
2 - LERR
3 - SCER
4 - CCD
5 - CNTL

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 13 OF 13	A REV

3.2.43 Test 4

Title:

Test 4

Symbolic Name:

TST4

Purpose:

To test each active line for proper operation of break.

Description:

Each active line is placed in the full duplex mode and forced to transmit breaks.

Entry Points:

TST4

Calling Sequence:

JMP TST4

Tables or Files Modified or Read:

LCB, ITYP

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

MIB, AIB, LSU, TIMO, RLIN, UNQ, SAO, and QUE

Exception and/or Error Conditions:

Synchronous lines may not be tested.

Timing (cycles):

Not applicable

Size:

$212_{(8)}$ words

Comments:

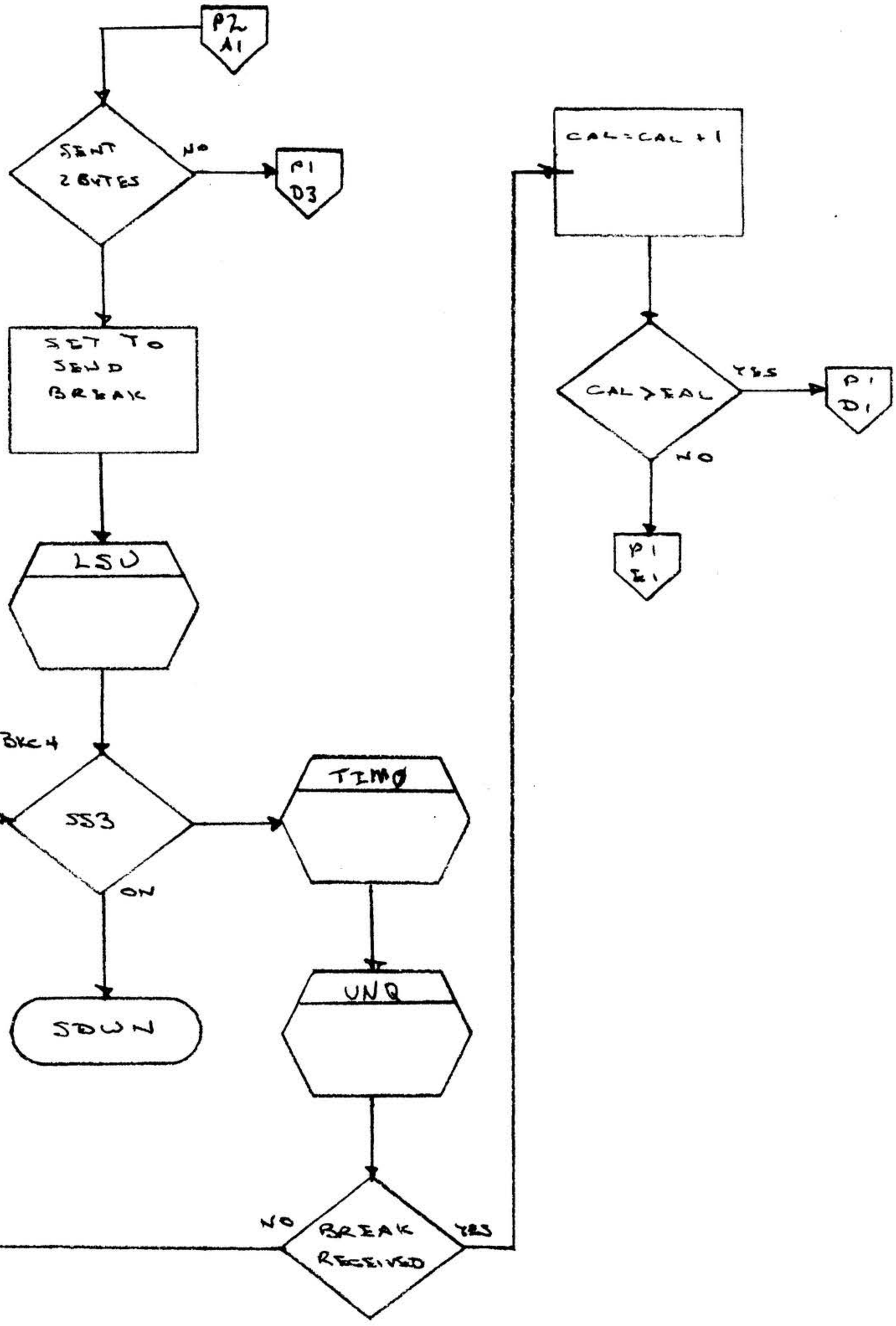
Interrupts used

0 - IBC2
1 - OBCZ
2 - LERB
3 - SCER
4 - CCD
5 - CNTL

Hardware Details:

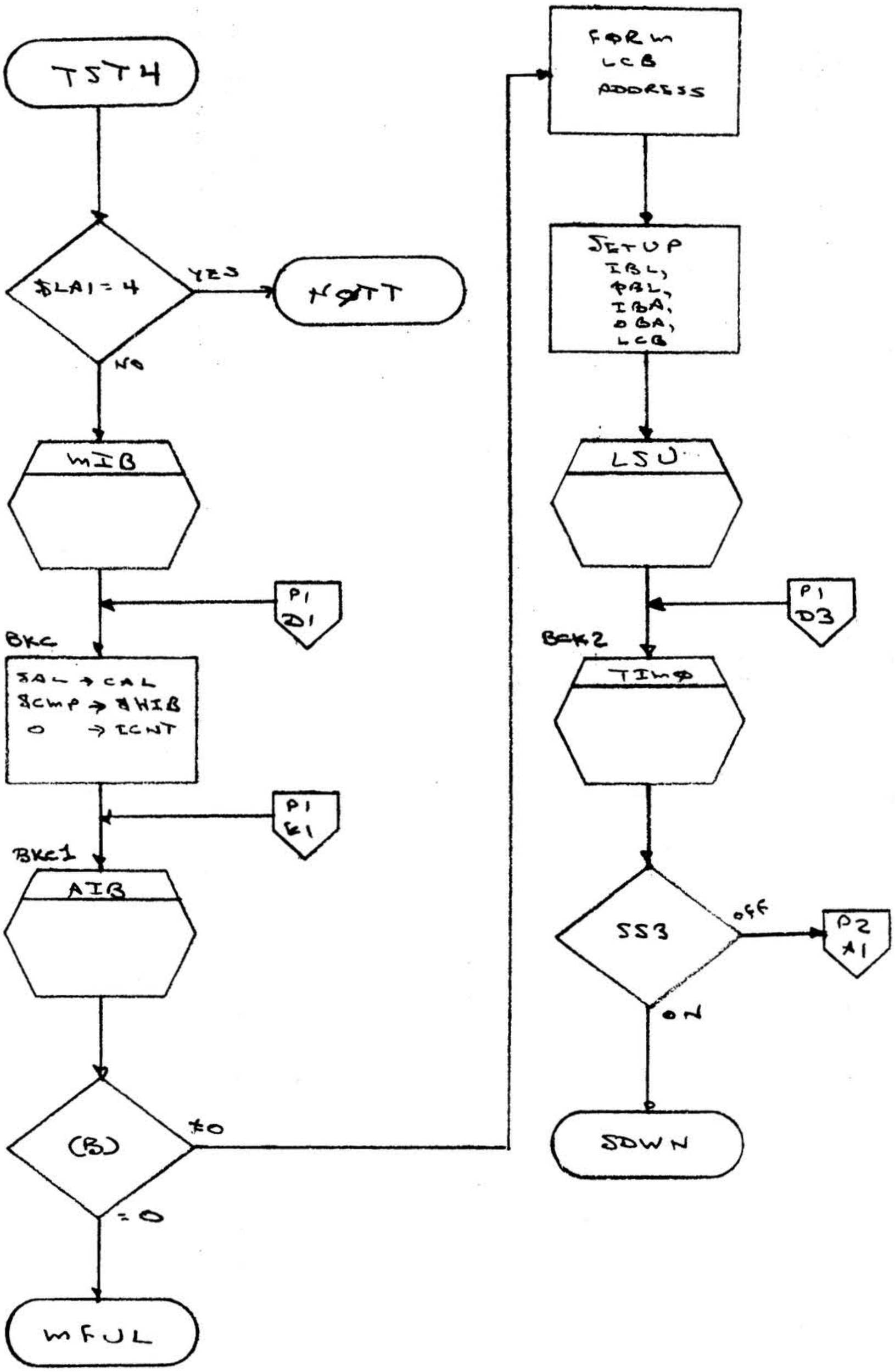
Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-134 OF	A REV

96A0393-000



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256	A
			SH 3-135 OF	REV

96A0393-000

3.2.44 Test 5

Title:

Test 5

Symbolic Name:

TST5

Purpose:

To test the DCM interrupts.

Description:

The following interrupts are forced and checked for correctness: overflow, control, and ring.

Entry Points:

TST5

Calling Sequence:

JMP TST5

Tables or Files Modified or Read:

LCB, ITYP

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

MIB, STST, LSU, UNQ, CAO, & SSWT*

*Maintain II subroutine

Exception and/or Error Conditions:

Ring is not tested for a direct connect LAD.

Timing:

Not applicable

Size:

$355_{(8)}$ words

Comments:

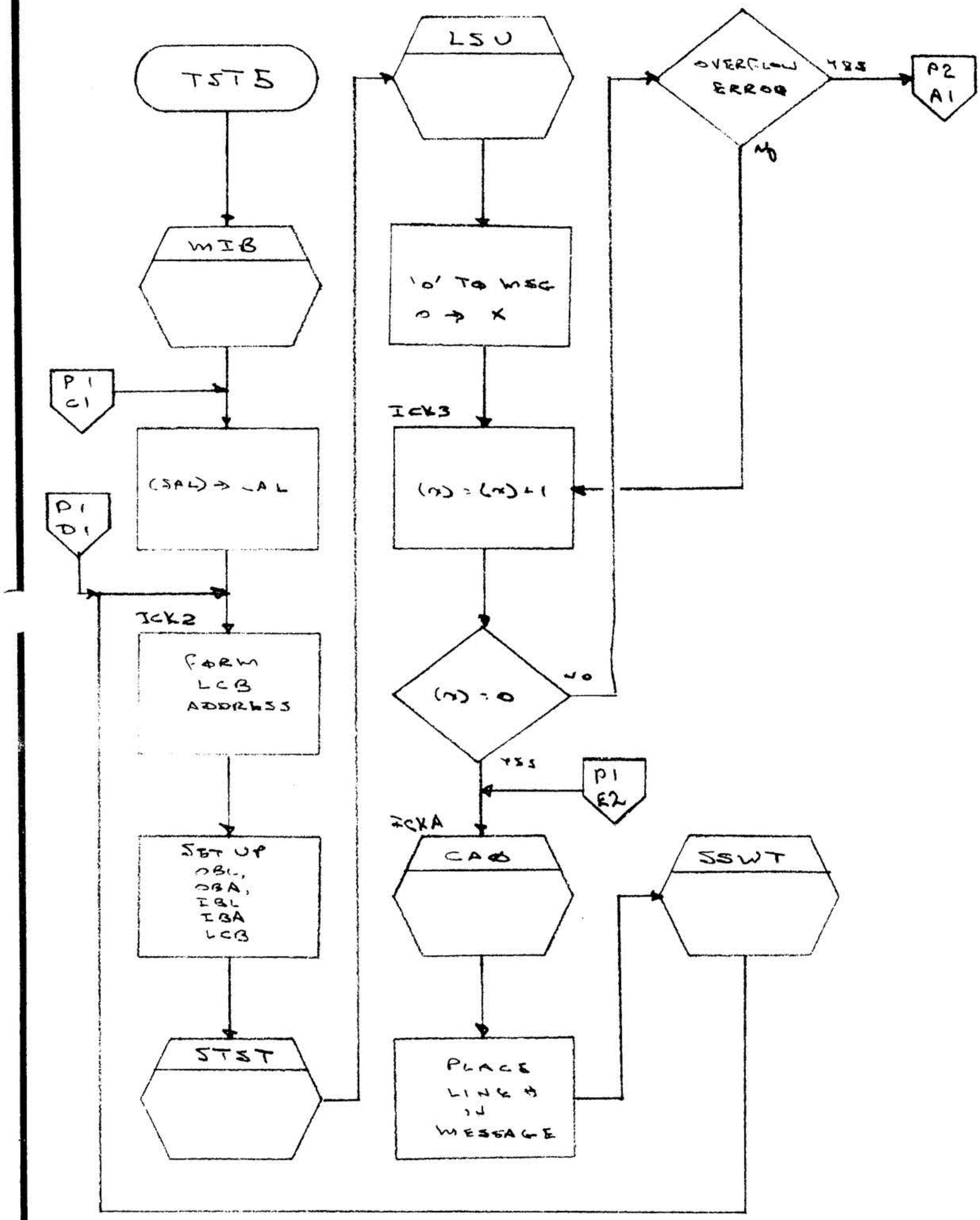
Interrupts used:

0 - IBZI
1 - OBZD
2 - LERI
3 - SCI
4 - CCD
5 - CNTL

Hardware Details:

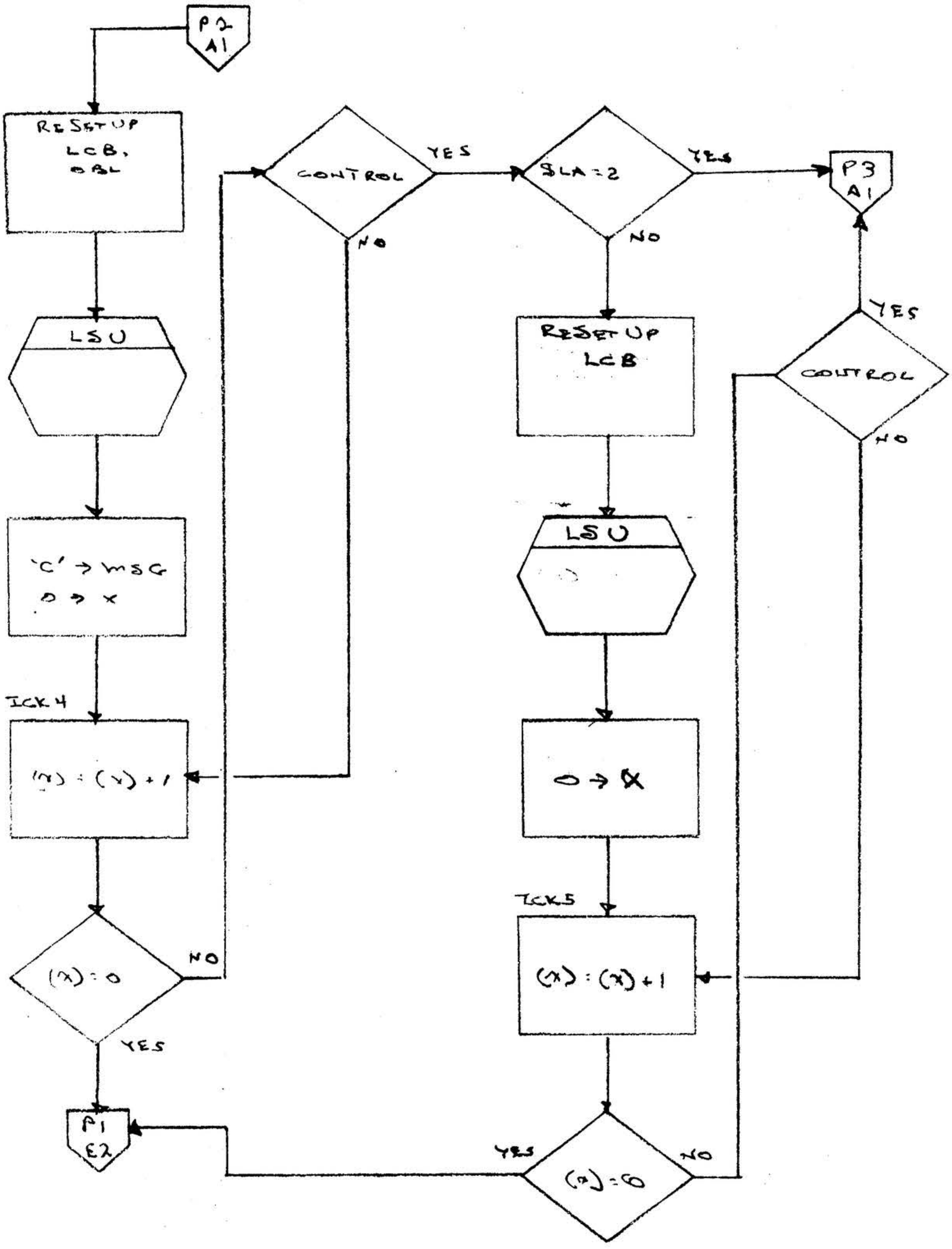
Not applicable

Flowcharts:



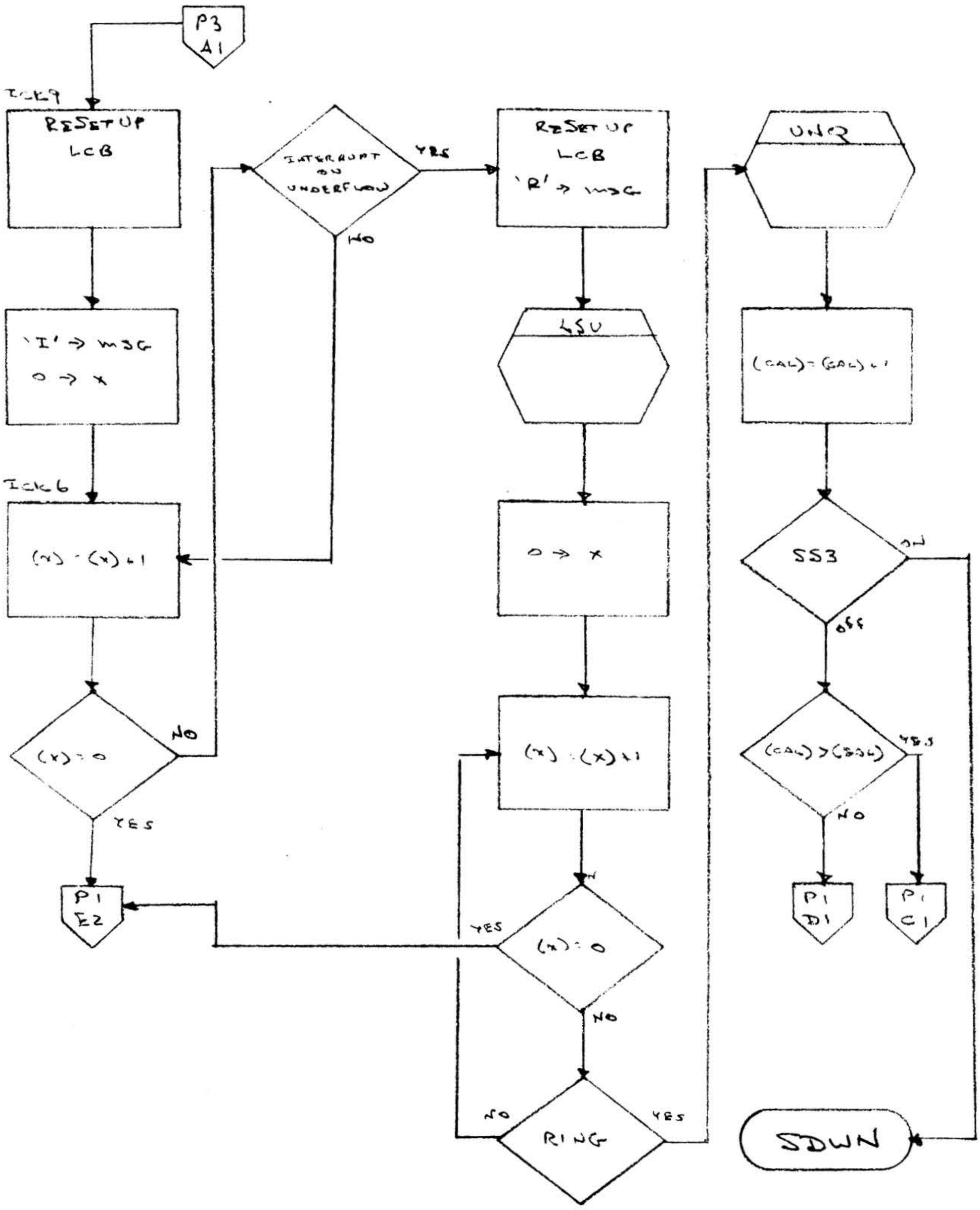
varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256	A
			SH3-138 OF	REV

96A0393-000



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256	A
			SH 3-1390F	REV

96A0393-000



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-140F	A REV

96A0393-000

3.2.45 Test 6

Title:

Test 6

Symbolic Name:

TST6

Purpose:

To check for correct status response.

Description:

Each active lines checked for correct response to DTR & T.

Entry Points:

TST6

Calling Sequence:

JMP TST6

Tables or Files Modified or Read:

LCB

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

MIB, UNQ, LSU, CAO, SSWT*, RLS

*Maintain II subroutine

Exception and/or Error Conditions:

Direct connect may not be tested.

Timing:

Not applicable

Size:

$170_{(8)}$ words

Comments:

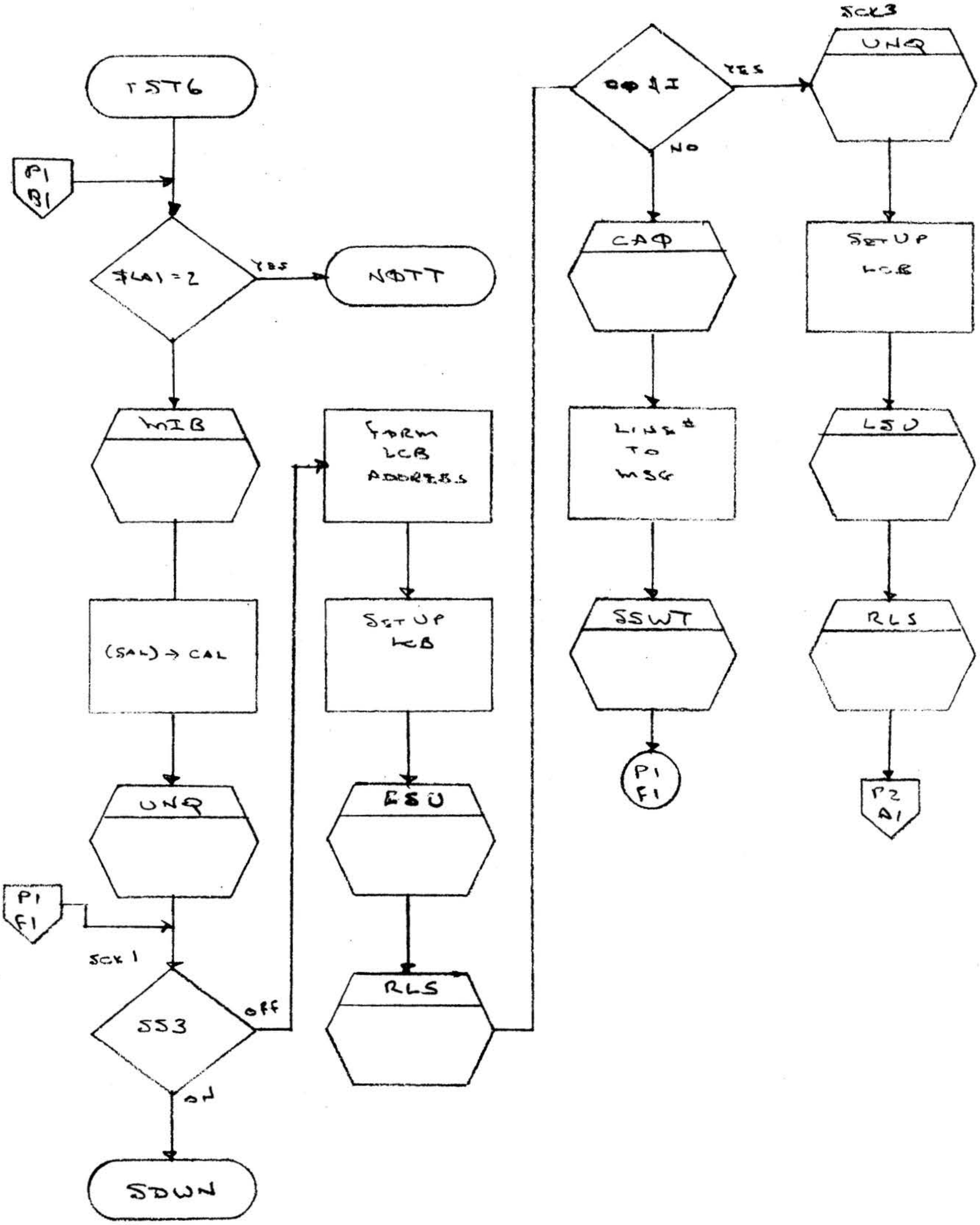
Interrupts used:

0 - IBZI
1 - OBZI
2 - LERR
3 - SCER
4 - CCD
5 - CNTL

Hardware Details:

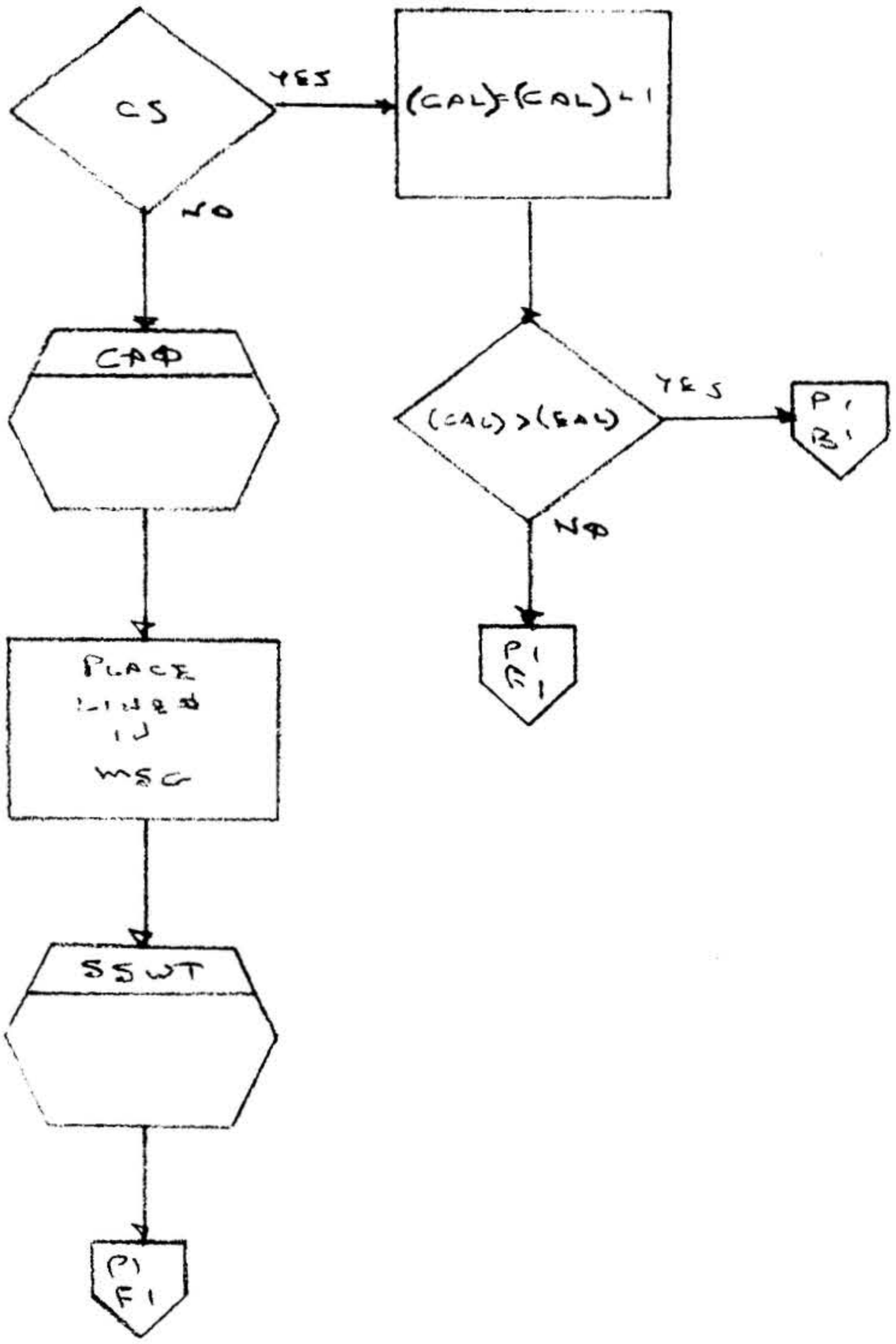
Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256	A
			SH 3-143 OF	REV

98A0393-000



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-144 OF	4 REV

96A0393-000

3.2.46 Test 7

Title:

Test 7

Symbolic Name:

TST7

Purpose:

To test for large byte count.

Description:

Each active line is requested to transmit 2048 words of data. This is received in 128 word blocks.

Entry Points:

TST7

Calling Sequence:

JMP TST7

Tables or Files Modified or Read:

LCB

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

MIB, AIB, LSU, UNQ, CAO, & QUE

Exception and/or Error Conditions:

Synchronous line may not be tested.

Timing (cycles):

Not applicable

Size:

$207_{(8)}$ words

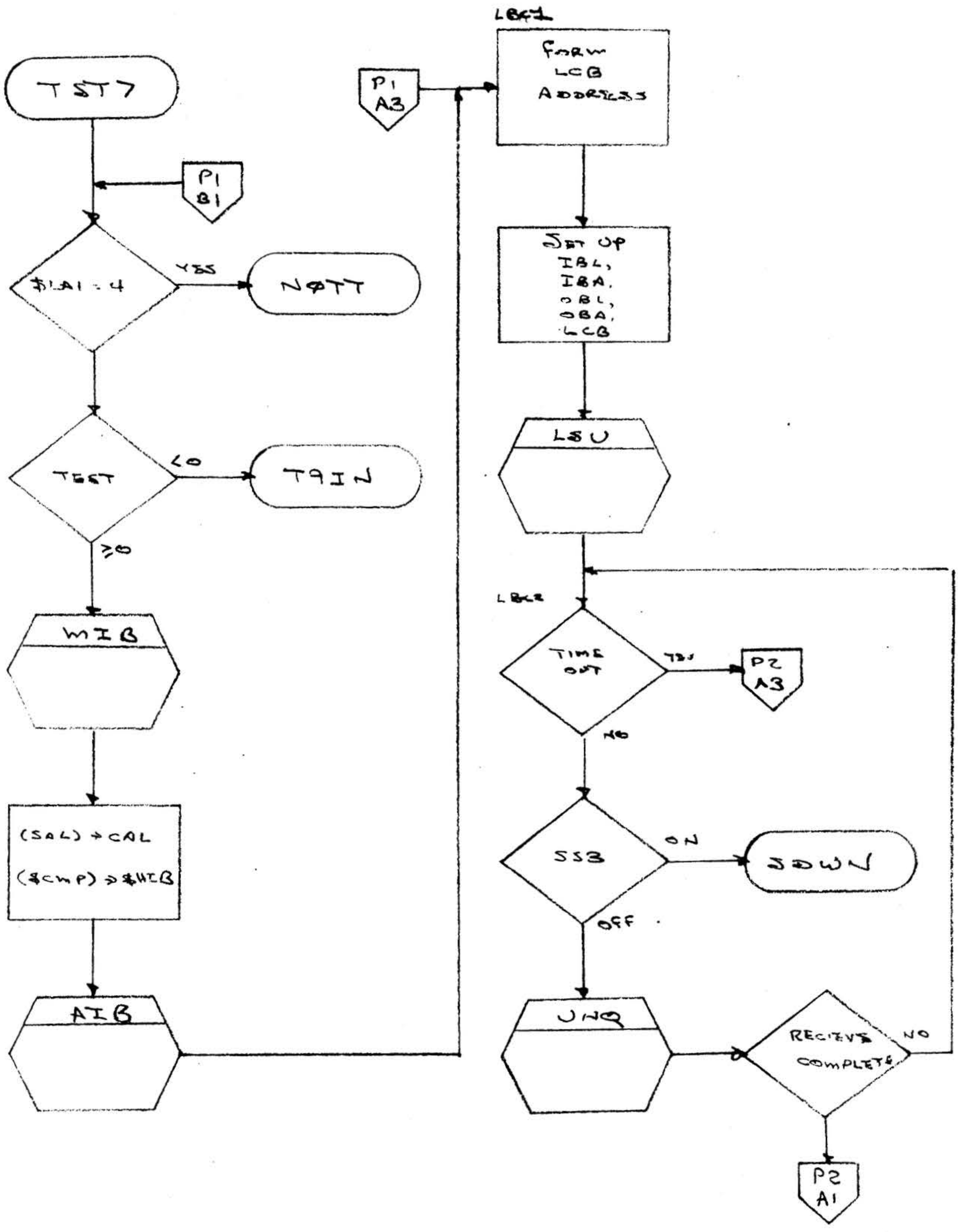
Comments:

Interrupts Used	0 - IBC7
	1 - OBCZ
	2 - LERR
	3 - SCER
	4 - CCD
	5 - CNTL

Hardware Details:

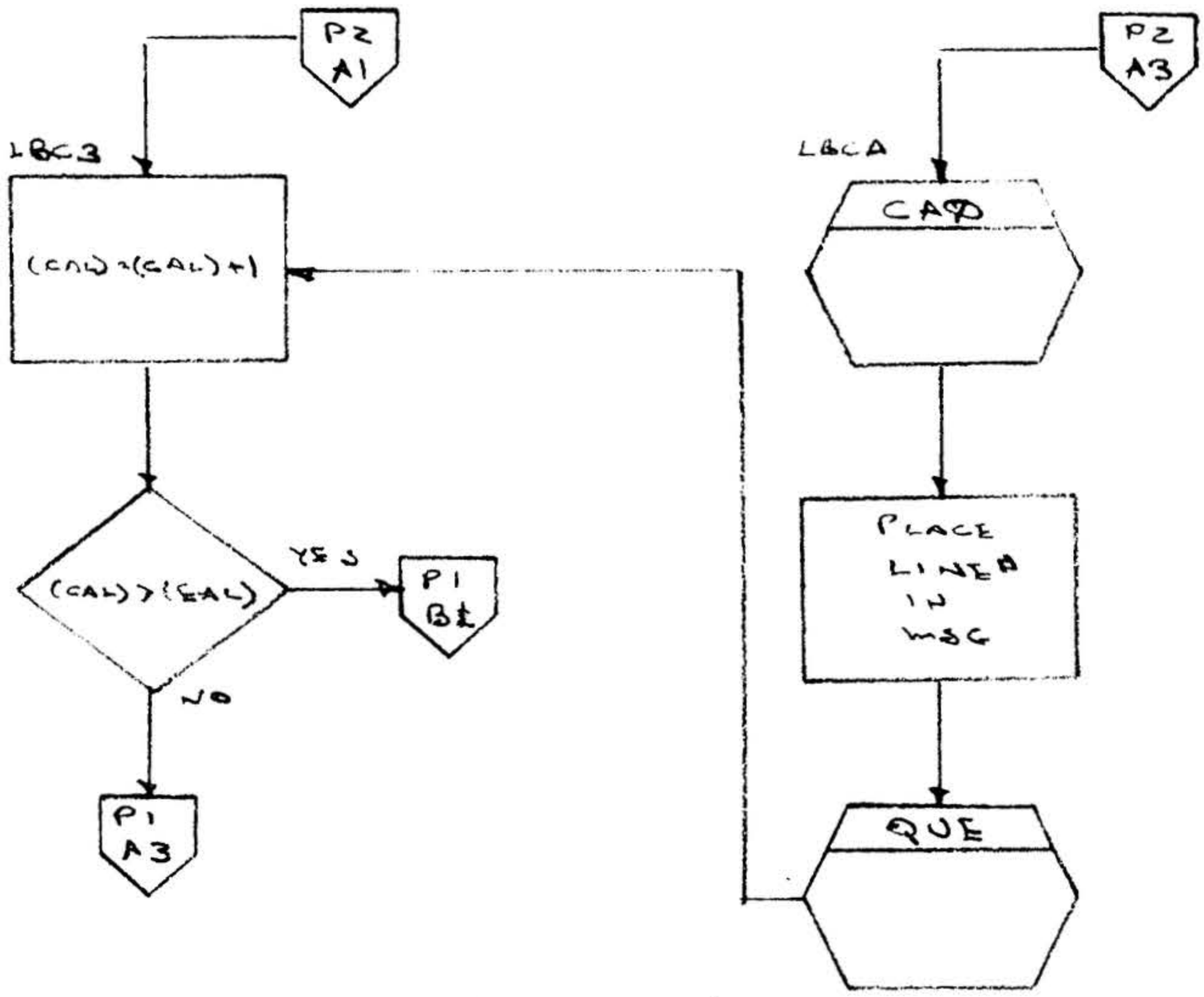
Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH3-147OF	A REV

96A0393-000



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-148 OF	A REV

96A0393-000

3.2.47 Test 10

Title:

Test 10

Symbolic Name:

TST8

Purpose:

To allow each active line to echo.

Description:

Each active line is set up to echo a character. When 256 bytes have been received, the transmit is checked to see that it didn't complete.

Entry Points:

TST8

Calling Sequence:

JMP TST8

Tables or Files Modified or Read:

LCB

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

MIB, AIB, LSU, UNQ, CAO, & QUE

Exception and/or Error Conditions:

Synchronous lines may not be tested.

Timing (cycles):

Not applicable

Size:

$171_{(8)}$ words

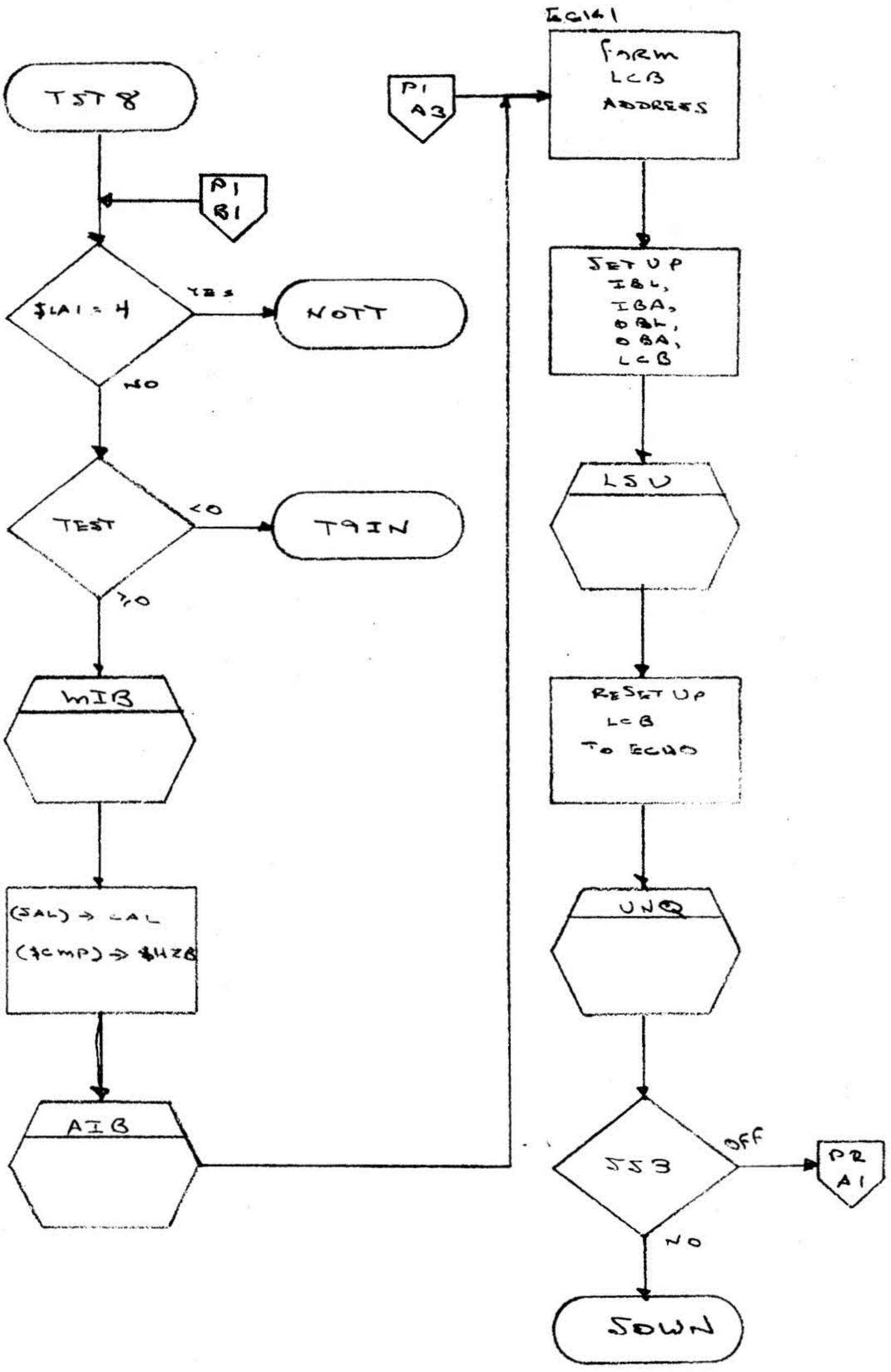
Comments:

Interrupts used	0 - IBCZ
	1 - OBCZ
	2 - LERR
	3 - SCER
	4 - CCDI
	5 - CNTL

Hardware Details:

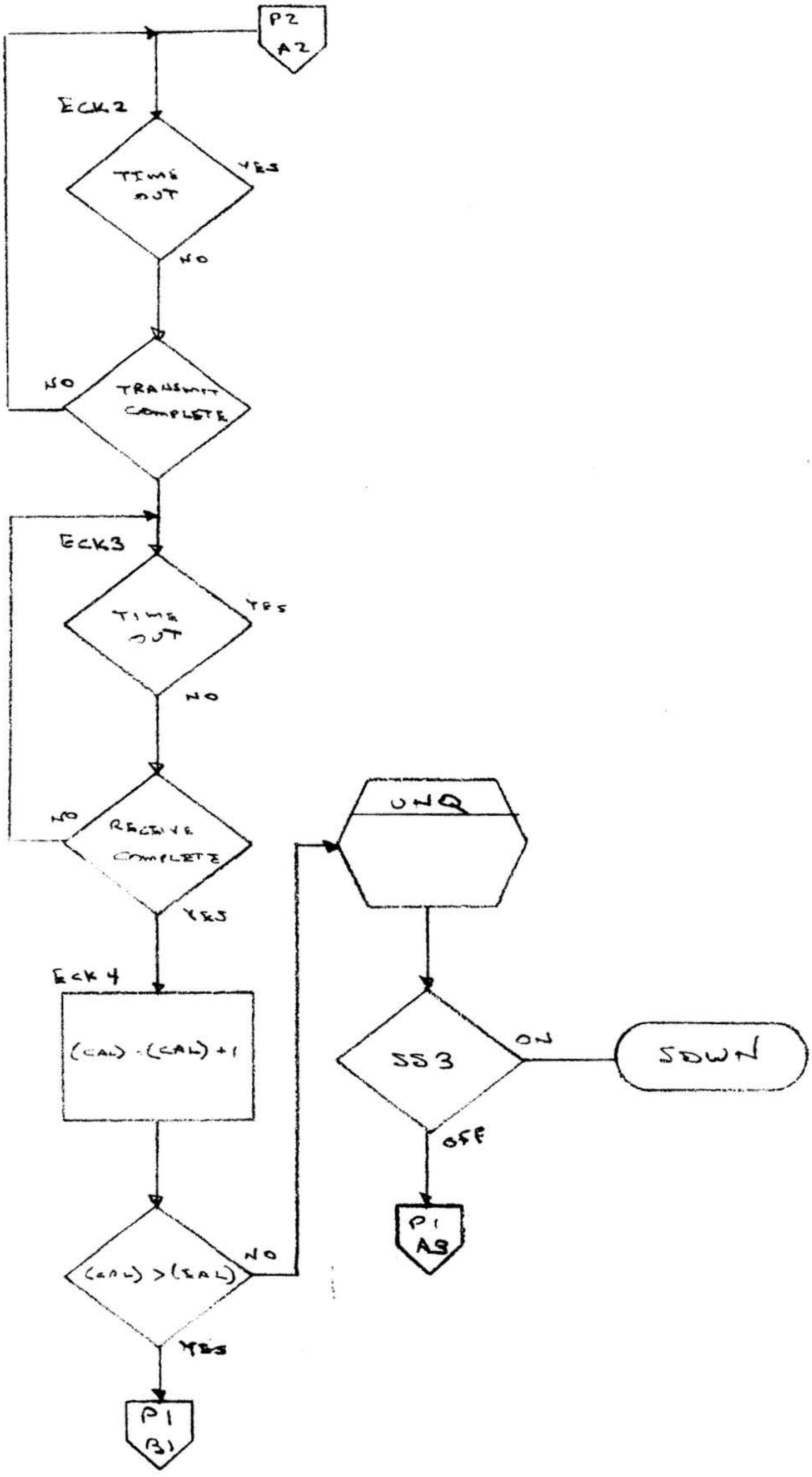
Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-151 OF	A REV

96A0393-000



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-1520F	A REV

96A0393-000

3.2.48 **Test #1**

Title:

Test 11

Symbolic Name:

TST9

Purpose:

To test synchronous lines ability to sync on various data bytes.

Description:

All active lines are allowed to transmit/receive using pre-assigned sync characters.

Entry Points:

TST9

Calling Sequence:

JMP TST9

Tables or Files Modified or Read:

LCB

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

MIB, AIB, STST, LSU, UNQ, CAO, & QUE

Exception and/or Error Conditions:

Only synchronous lines may be tested.

Timing (cycles):

Not applicable

Size:

$226_{(8)}$ words

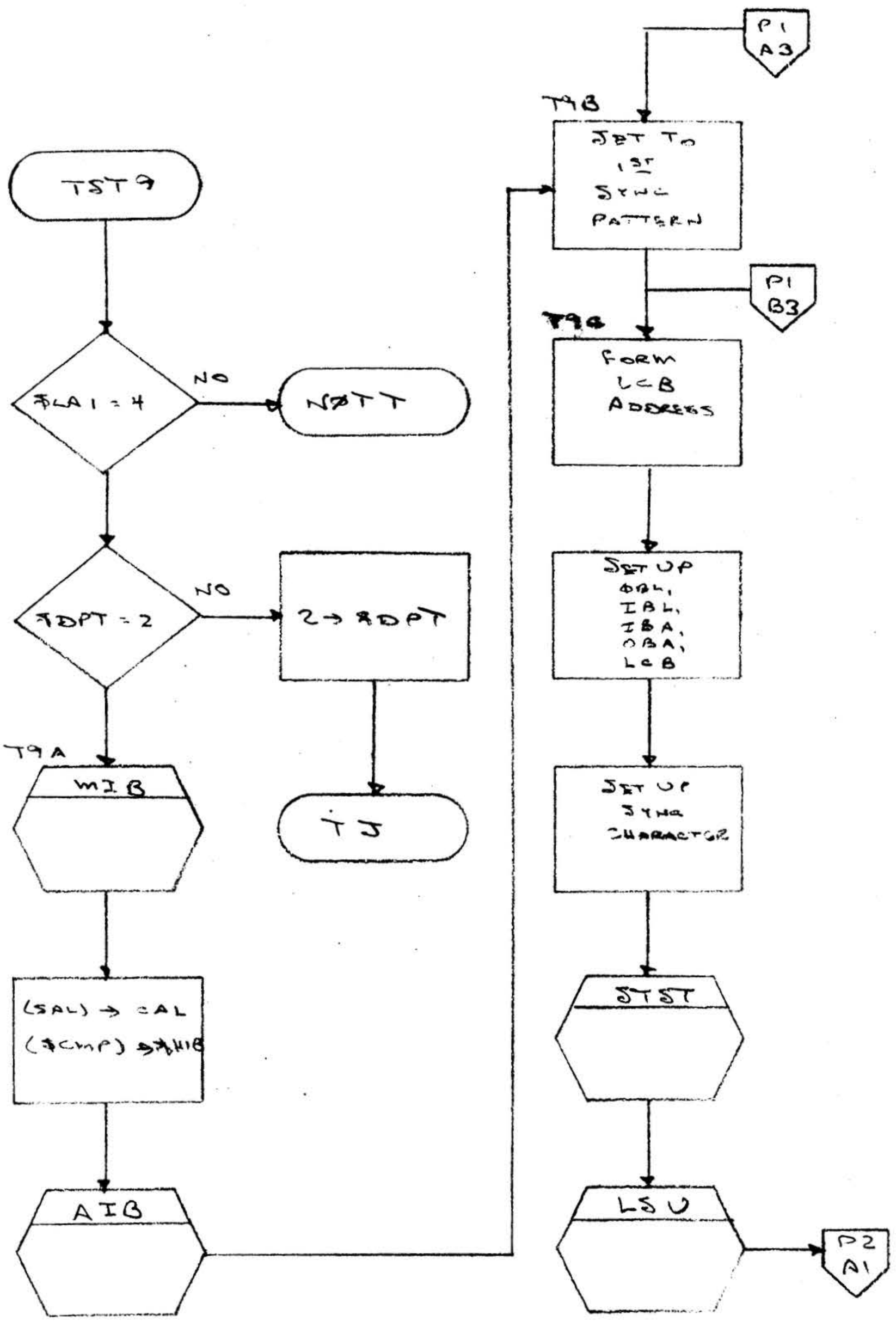
Comments:

Interrupts used - See Test 1
Sync characters 0335, 0333, 0327, 0325, 0323, 032, 022', 0122, 0264, 0232, 0226

Hardware Details:

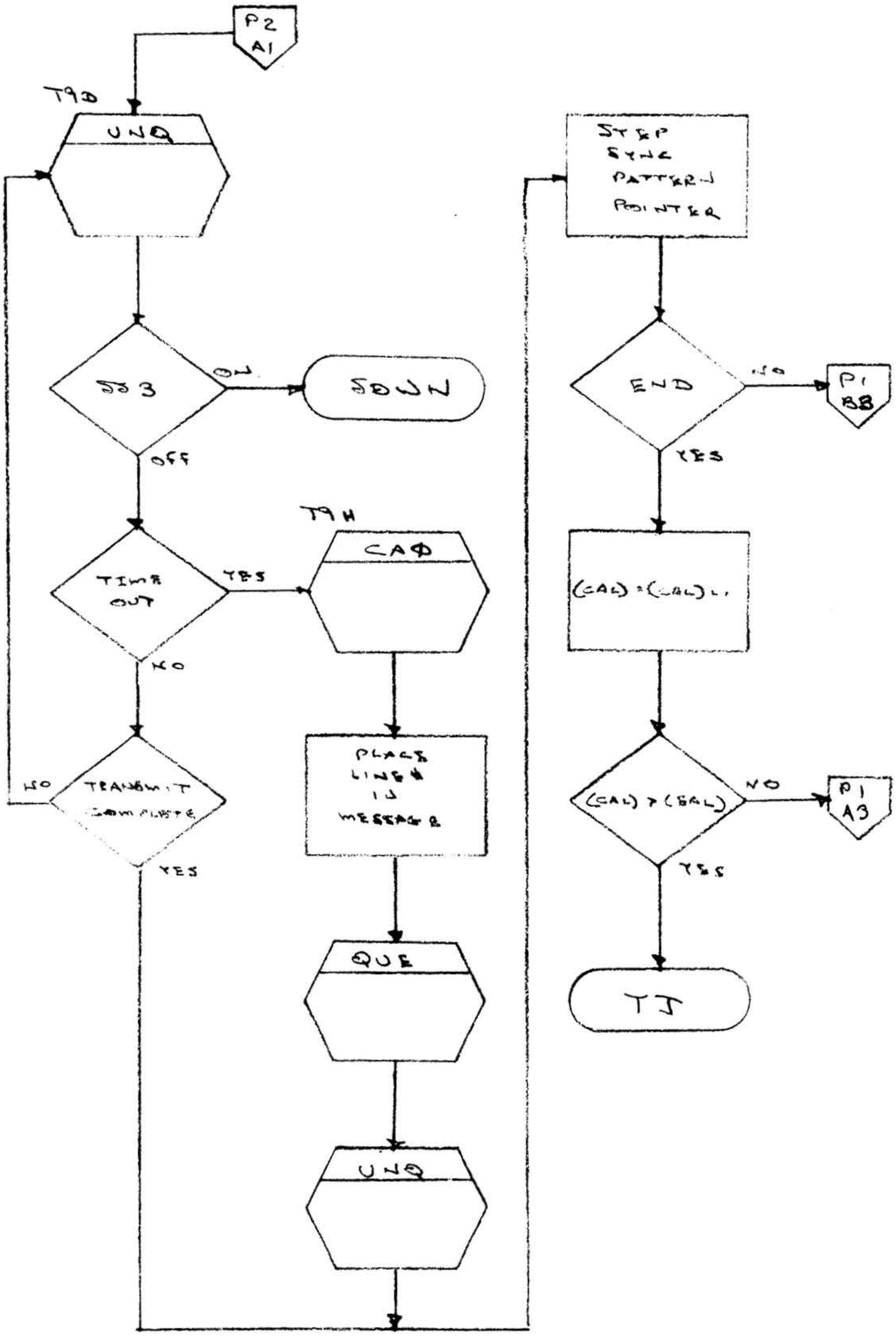
Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-155 OF	A REV

96A0393-000



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH3-156OF	A REV

96A0393-000

3.2.49 Test 12

Title:

Test 12

Symbolic Name:

TS10

Purpose:

To check each active line for transmit re-sync.

Description:

Each active line is forced to re-sync in the middle of the transmit block. This will force the line into an overrun condition.

Entry Points:

TS10

Calling Sequence:

JMP TS10

Tables or Files Modified or Read:

LCB

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

MIB, AIB, STST, LSU, UNQ, CAO & QUE

Exception and/or Error Conditions:

Synchronous lines only may be tested.

Timing (cycles):

Not applicable

Size:

$202_{(8)}$ words

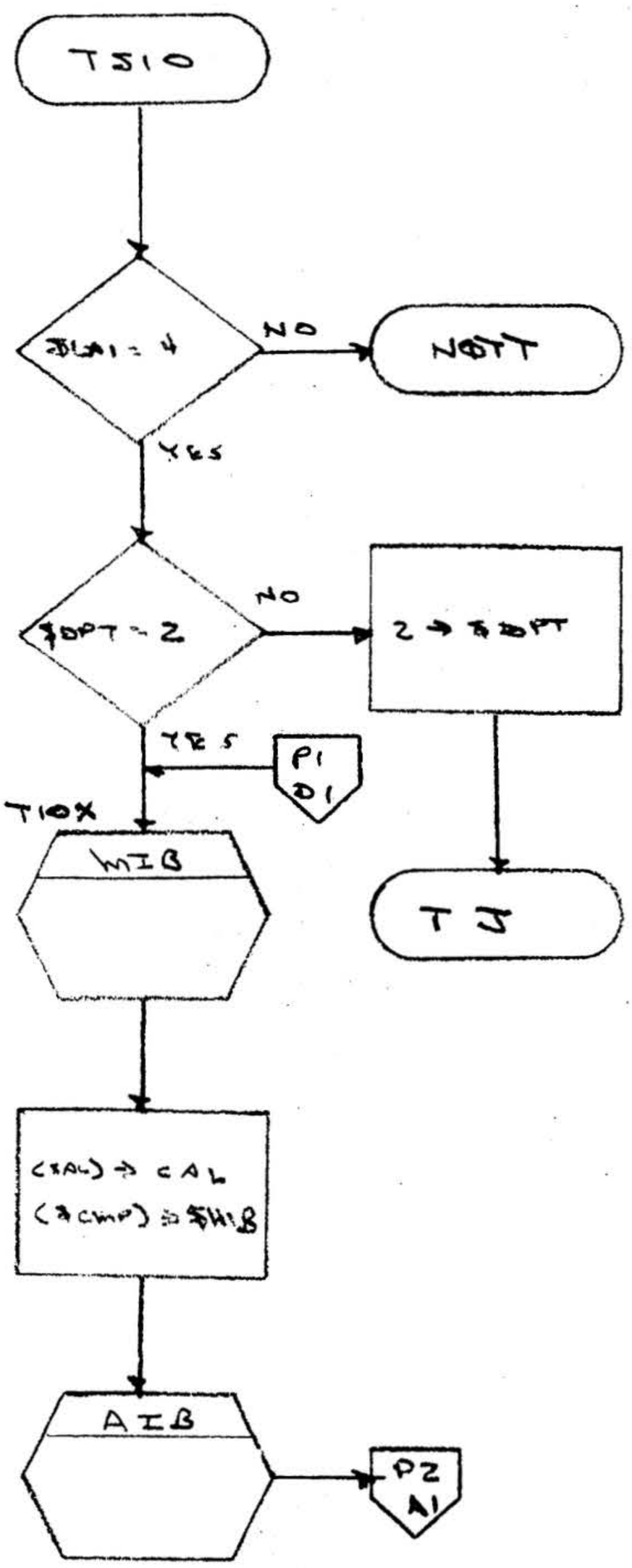
Comments:

Interrupts used - See Test 5

Hardware Details:

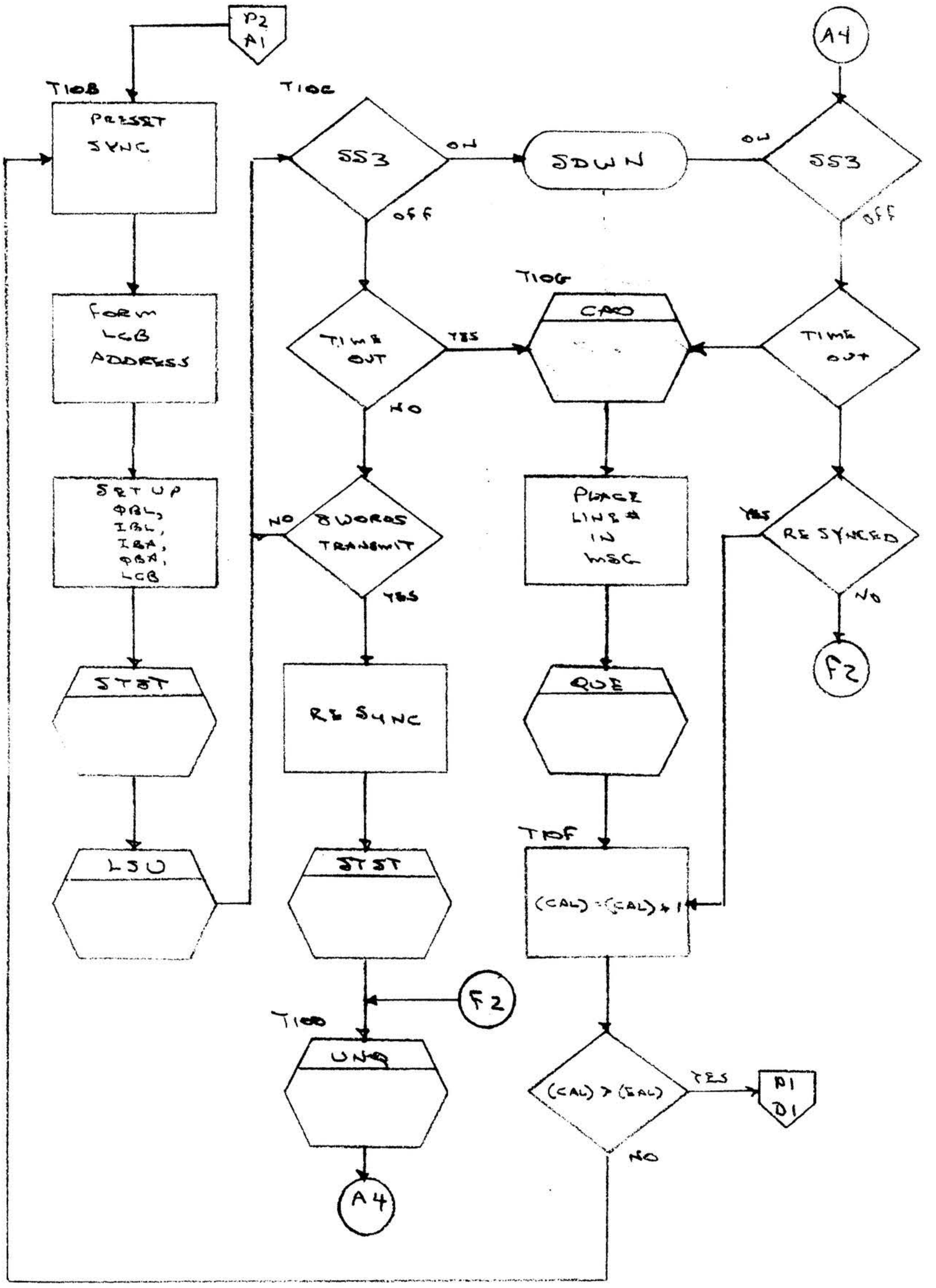
Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-159 OF	A REV

98A0393-000



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-160 OF	A REV

96A0393-000

3.2.50 Test 13

Title:

Test 13

Symbolic Name:

TS11

Purpose:

To test the transmit sync character.

Description:

All combinations of transmit sync characters are enabled on all active lines and checked for correctness.

Entry Points:

TS11

Calling Sequence:

JMP TS11

Tables or Files Modified or Read:

LCB

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

MIB, AIB, STST, LSU, CAO, QUE, & UNQ

Exception and/or Error Conditions:

Synchronous lines only may be tested.

Timing:

Not applicable

Size:

$175_{(8)}$ words

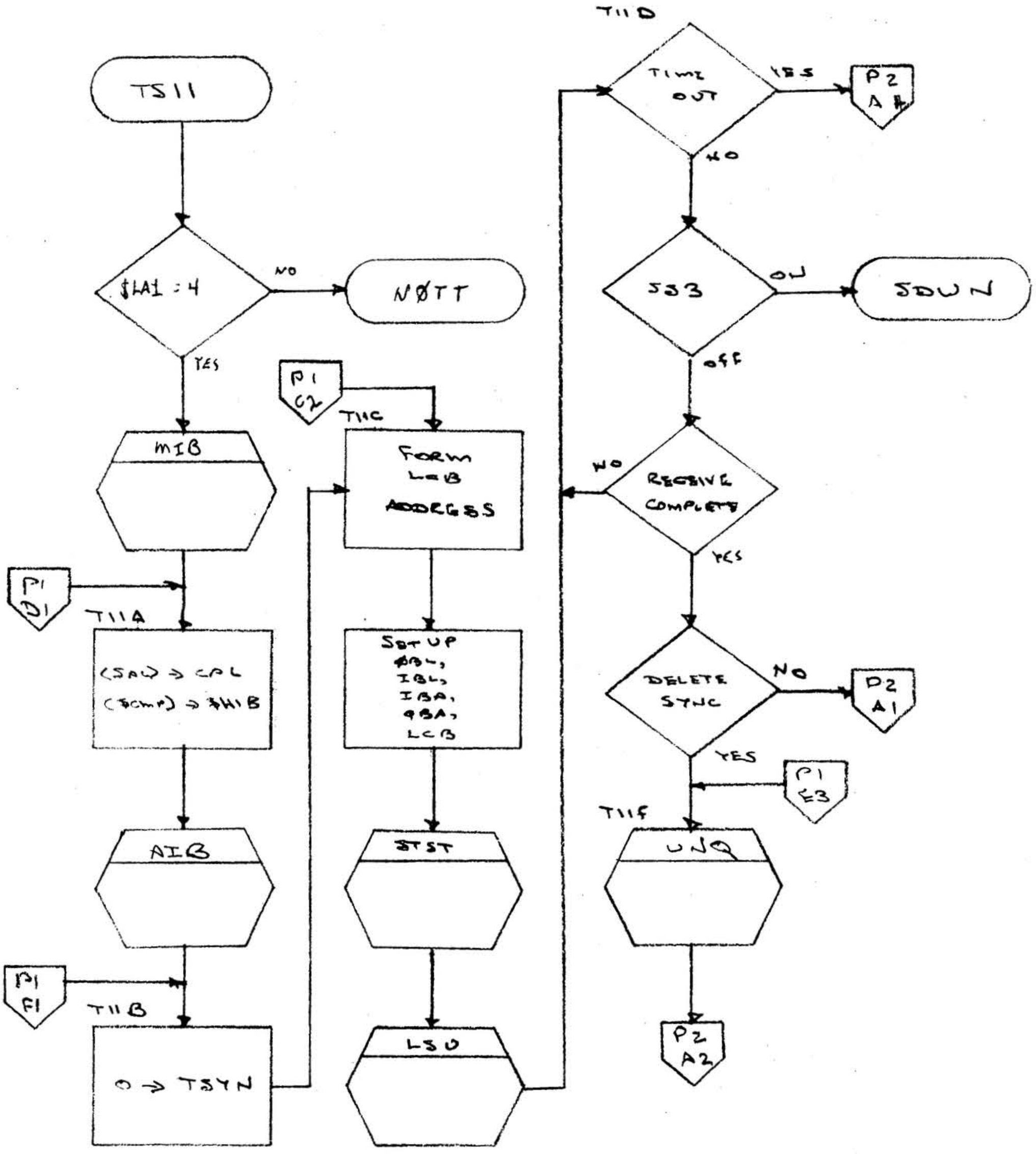
Comments:

Interrupts used: See Test 1

Hardware Details:

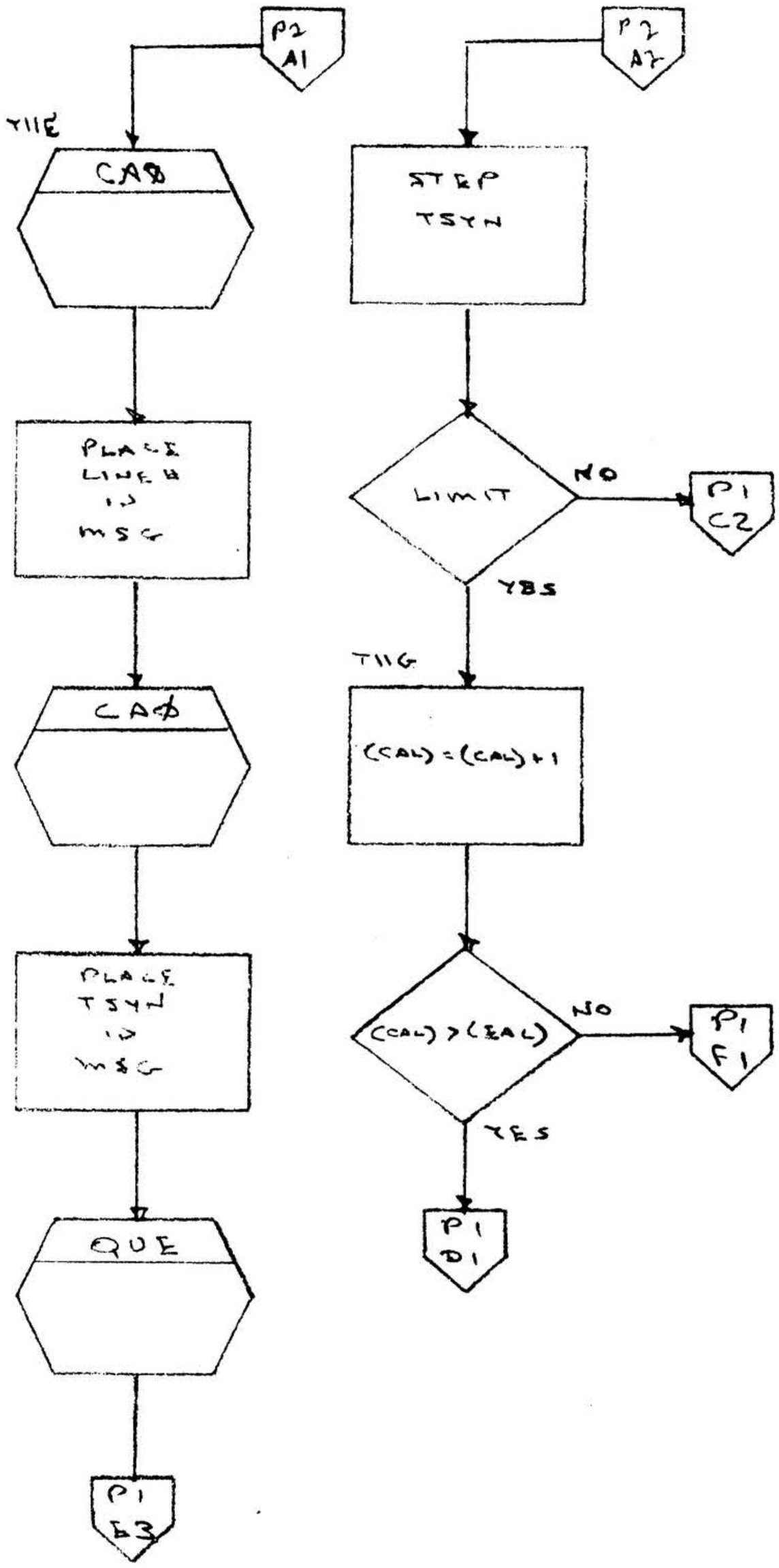
Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256	A
			SH 3-163 OF	REV

96A0393-000



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3/64/OF	A REV

96A0393-000

3.2.51 Test 14

Title:

Test 14

Symbolic Name:

TS12

Purpose:

To test auto parity

Description:

All active lines transmit/receive in auto parity mode. All received bytes are checked to see that the MSB is not received.

Entry Points:

TS12

Calling Sequence:

JMP TS12

Tables or Files Modified or Read:

LCB

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

MTB, AIB, STST, LSU, TIMO, RLIN, UNQ, CAO, & QUE

Exception and/or Error Conditions:

Only 8 bit synchronous lines may be tested

Timing (cycles):

Not applicable

Size:

$222_{(8)}$ words

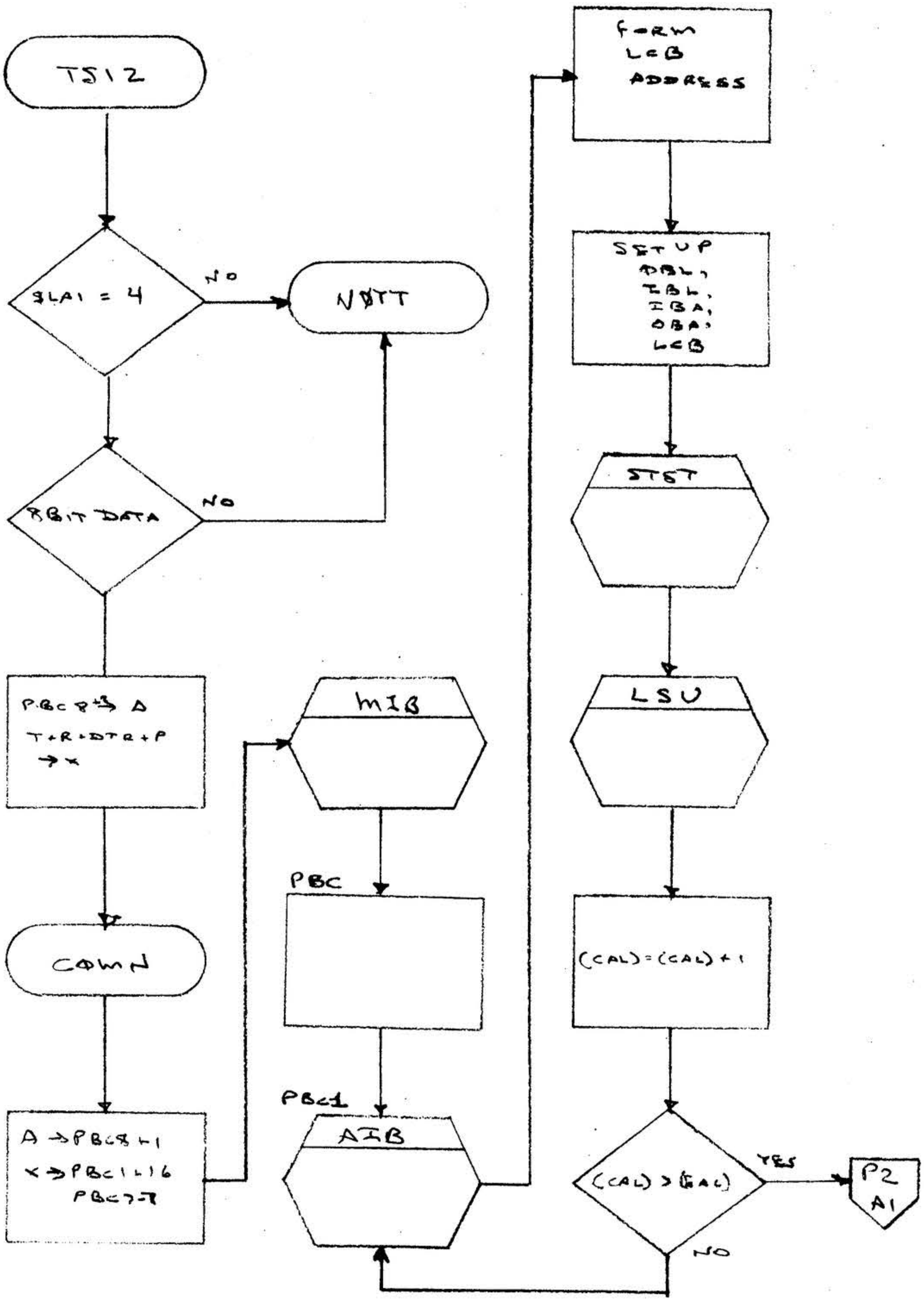
Comments:

Interrupts used - See Test 1

Hardware Details:

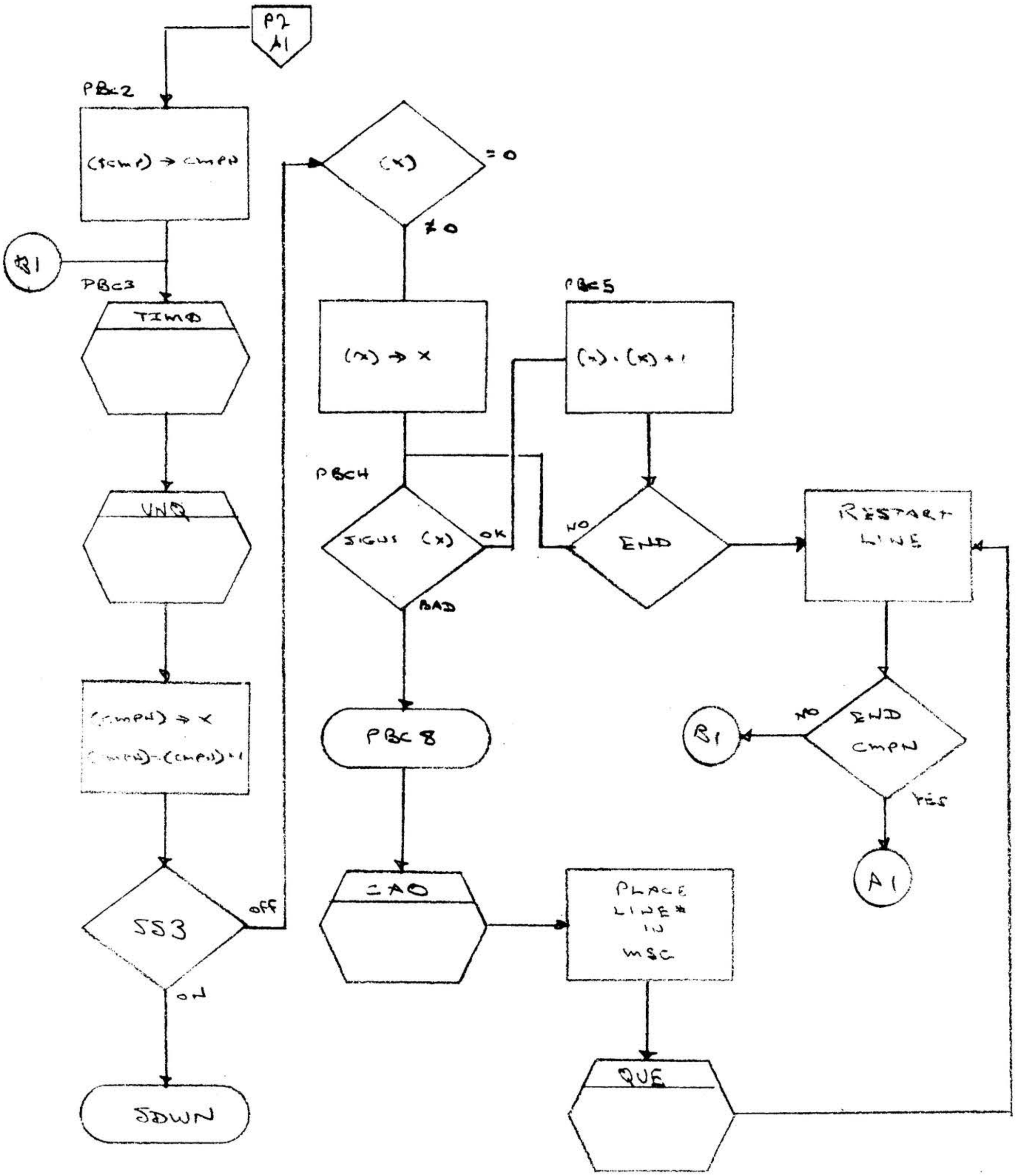
Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH3-167 OF	A REV

96A0393-000



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH3-168 OF	A REV

96A0393-000

3.2.52 Test 15

Title:

Test 15

Symbolic Name:

TS13

Purpose:

To test for non accessing of output data.

Description:

Each active line is set-up to transmit/receive with the AR bit set in the line control byte. No data should be accessed from memory.

Entry Points:

TS13

Calling Sequence:

JMP TS13

Tables or Files Modified or Read:

LCB

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

MIB, AIB, STST, LSU, TIMO, RLIN, UNQ, CAO & QUE

Exception and/or Error Conditions:

Synchronous lines only may be tested.

Timing (cycles):

Not applicable

Size:

$151_{(8)}$ words

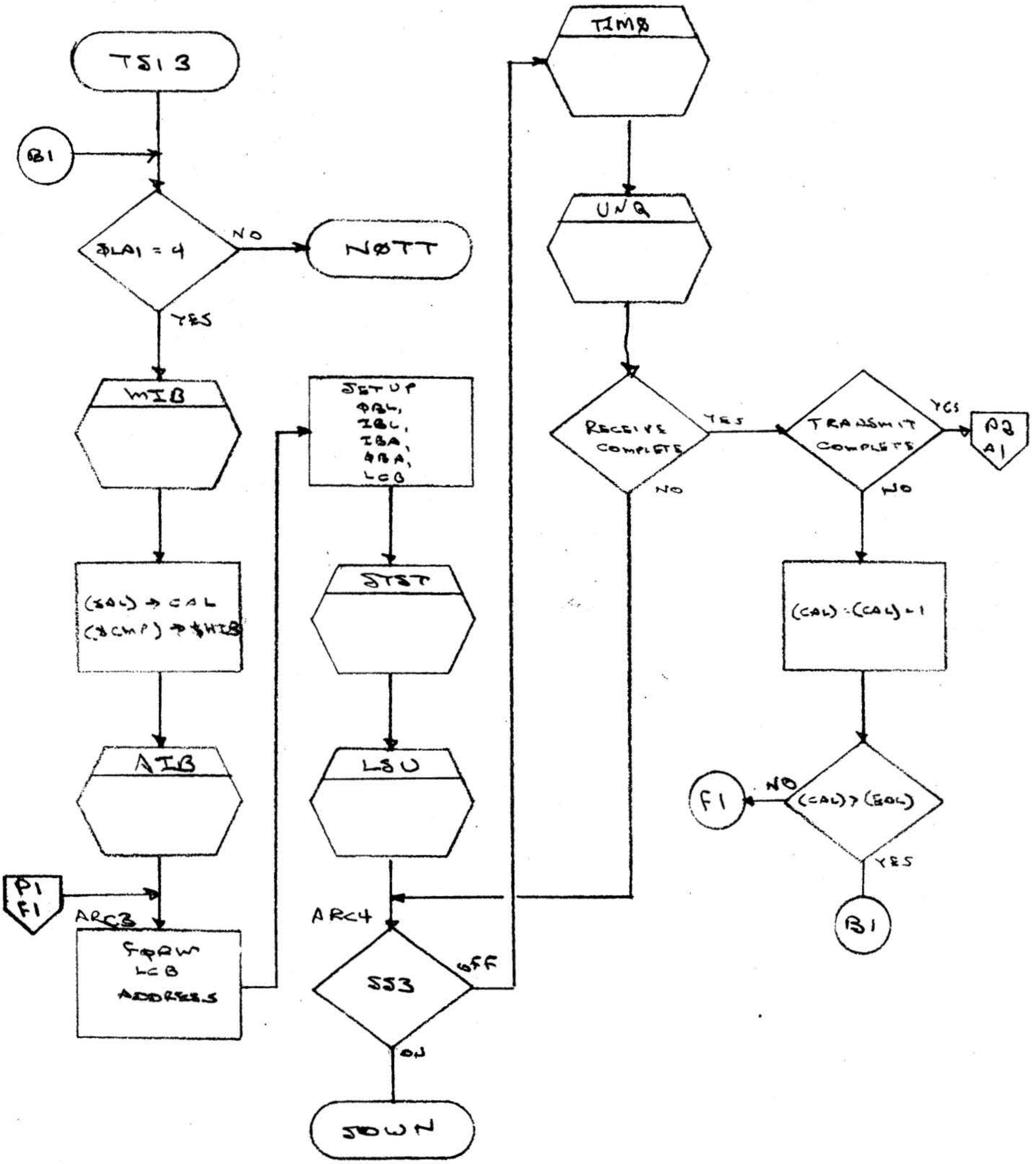
Comments:

Interrupts used. See Test 1

Hardware Details:

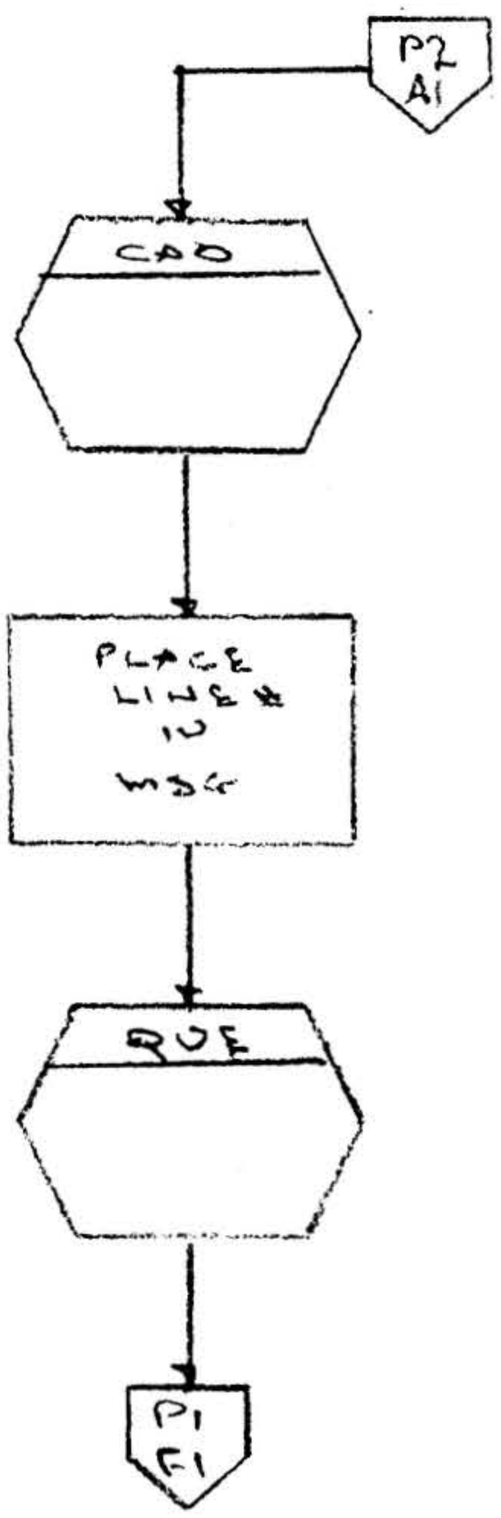
Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256	A REV
			SH 3-17/OF	

96A0393-000



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-172 OF	A REV

96A0393-000

3.2.53 Test 16

Title:

Test 16

Symbolic Name:

TS14

Purpose:

To test failures to sync on one sync character

Description:

Each active line transmits/receives character block of data with only one sync character.

Entry Points:

TS14

Calling Sequence:

JMP TS14

Tables or Files Modified or Read:

LCB

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

MIB, AIB, STST, LSU, UNQ, CAO, & QUE

Exception and/or Error Conditions:

Synchronous lines only may be tested.

Timing (cycles):

Not applicable

Size:

$153_{(8)}$ words.

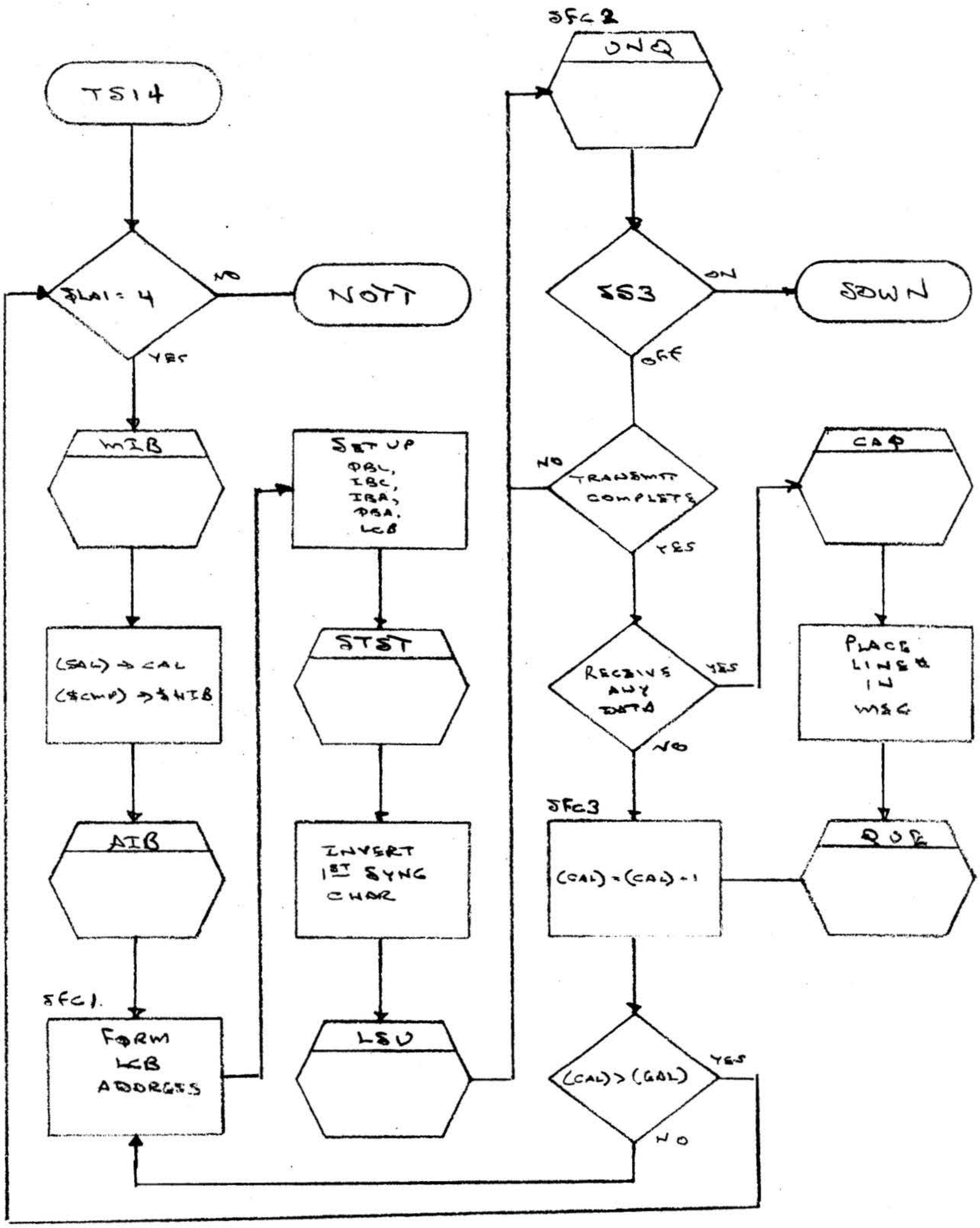
Comments:

Interrupts used. See test 1

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256	A
			SH 3-17 OF	REV

98A0393-000

3.2.54 Test 17

Title:

Test 17

Symbolic Name:

IS15

Purpose:

To test the VDM ASCII mode.

Description:

All active lines transmit/receive in VDM ASCII mode. All received bytes are checked to see that the MSB is on.

Entry Points:

TS15

Calling Sequence:

JMP TS15

Tables or Files Modified or Read:

LCB

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

PBC

Exception and/or Error Conditions:

None

Timing:

Not applicable

Size:

22 (8) words

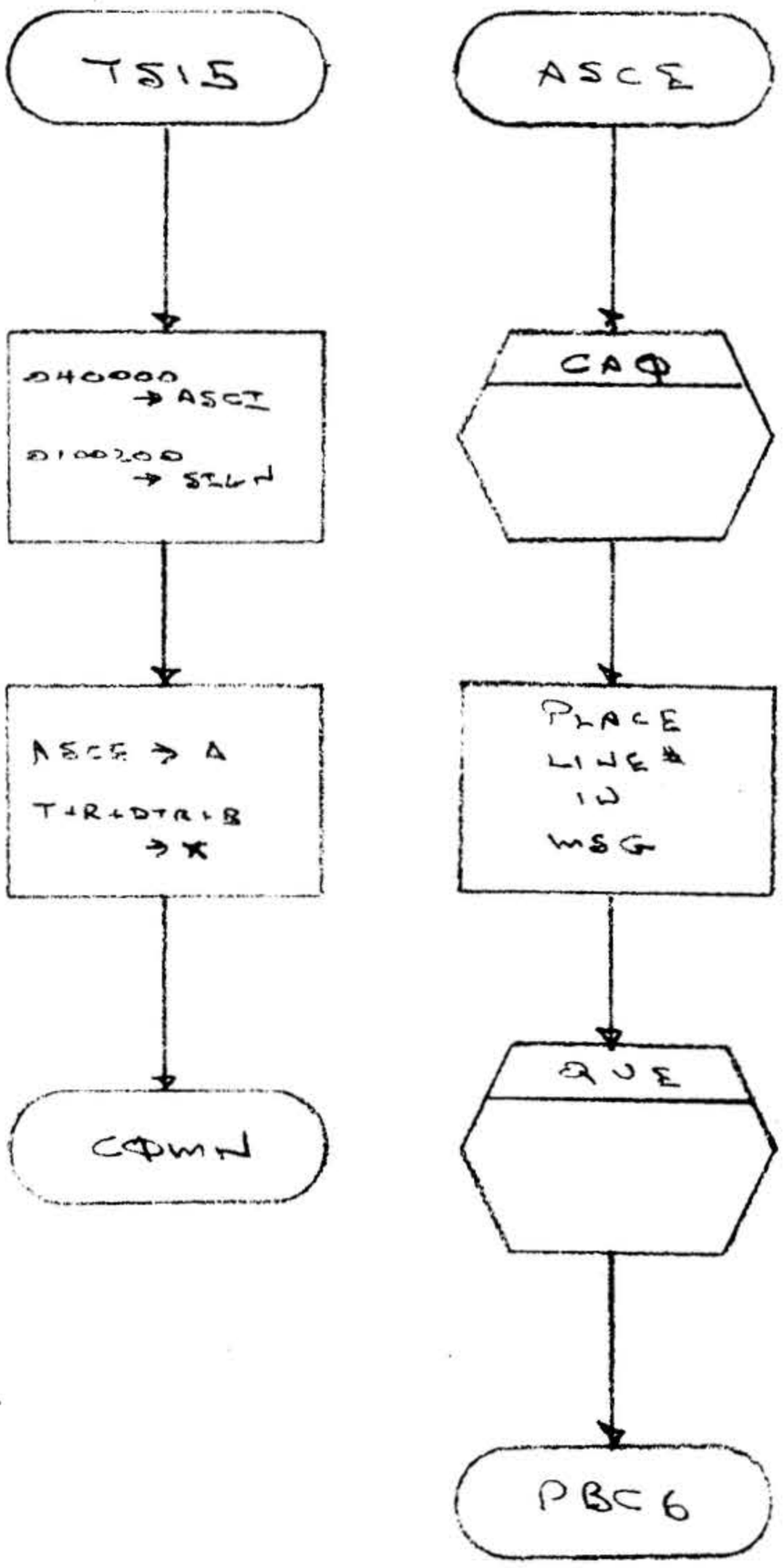
Comments:

Interrupts used - see Test 1.

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-178 OF	A REV

96A0393-000

3,2,55 **Test 77**

Title:

Test 77

Symbolic Name:

TT77

Purpose:

To provide a burn test.

Description:

All applicable tests are performed on all active lines.

Applicability

Test	Line Type
1	1,2,4
2	1,2,4
3	1,2
4	1,2
5	1,2,4
6	1,4
11	4
12	4
13	4
14	4
15	4
16	4
17	1, 2, 4

Entry Points:

TT77

Calling Sequence:

JMP TT77

Tables or Files Modified or Read:

Test, K

Tables or Files Created:

None

Called By Other Routines:

Not applicable

Called From This Routine:

None

Exception and/or Error Conditions:

None

Timing (cycles):

Not applicable

Size:

$25_{(8)}$ words

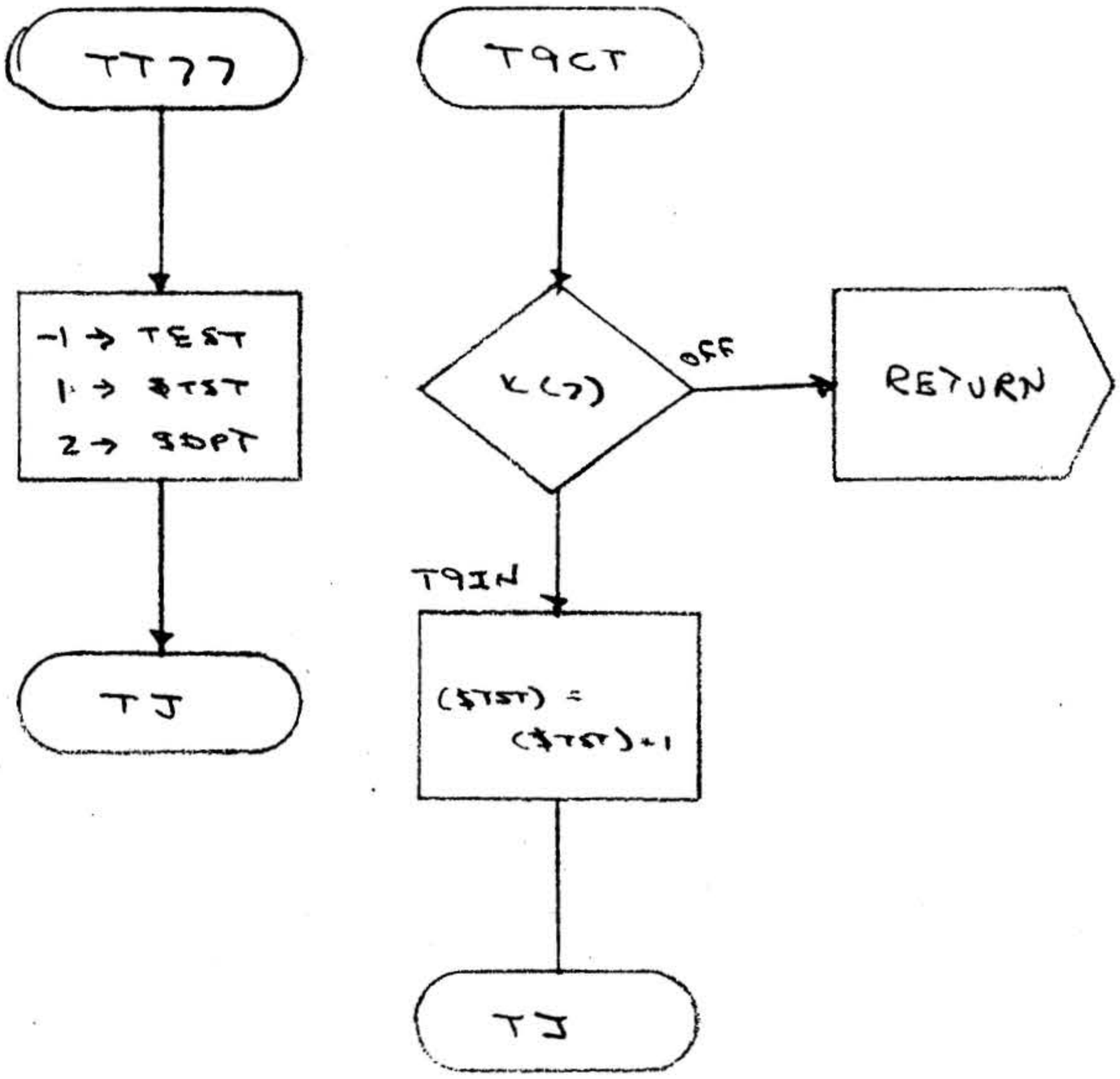
Comments:

None

Hardware Details:

Not applicable

Flowcharts:



varian data machines a varian subsidiary	CODE IDENT NO. 21101		89A0256 SH 3-181 OF	A REV

96A0393-000

SECTION 4
TEST SPECIFICATION

4.1 OBJECTIVES

The purpose of this section is to describe to what extent the program has been validated in terms of variations of applicable hardware configurations and other external input parameters. Using the teletype mode of operation, actual hardcopy of each component variance is presented. This will provide an aid in evaluating future claimed discrepancies observed in the program.

4.2 CONFIGURATIONS

This program has been exercised on the following hardware configurations:

620/i with 8192 words of memory
620/f with 8192 words of memory

4.3 DETAILED DESCRIPTIONS

The following hardcopy printout is provided to validate the responses received for each respective input.

Example of Primary input:

```
DCM TEST

LCR ADDRESS=17000.
DCM ADDRESS=70.
INTERRUPT ORIGIN= 60.
LINE ADAPTER TYPE=1.
DATA PATTERN= 2.
ACTIVE LINES= 40,43.
BIT LENGTH= 10.
TEST= 1.
LINE ADAPTER TYPE=1.
DATA PATTERN= 4,125252.
ACTIVE LINES= 40,42.
BIT LENGTH= 10.
TEST= 11.
NOT A VALID TEST FOR THIS LINE ADAPTER
LINE ADAPTER=2.
DATA PATTERN= 0.
ACTIVE LINES= 34,35.
BIT LENGTH= 7.
TEST= 3.
MIRROR IMAGE= 0.
LINE ADAPTER TYPE=4.
DATA PATTERN= 1.
ACTIVE LINES= 1,1.
BIT LENGTH= 6.
TEST= 12.
MIRROR IMAGE= 1.
000421 PASSES
LINE ADAPTER TYPE=4.
DATA PATTERN= 3.
ACTIVE LINES= 0,1.
BIT LENGTH= 5.
TEST= 77.
MIRROR IMAGE= 0.
000001 PASSES
LINE ADAPTER TYPE=1.
DATA PATTERN= 40.  INVALID
DATA PATTERN= .
ACTIVE LINES= 40,40.
BIT LENGTH= 10.
TEST= 77.
```