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TITLE

SOFTWARE PERFORMANCE SPECIFICATION
 ASYNCHRONOUS SERIAL CONTROLLER TEST

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SECTION 1 TEST PROGRAM OVERVIEW

1.1 INTRODUCTION

The purpose of this program is to provide the user with an adaptable routine to test the operational status of the Universal Asynchronous Serial Controller (UASC) and to assist in isolating malfunctions.

1.2 PROGRAM DESIGN OVERVIEW

The UASC test program is designed to operate with the 620 Test Executive which provides all the user interface routines, utility functions and standard subroutines. Consequently, the Test Executive must be loaded prior to operating the UASC (see Software Performance Specification No. 89A0122).

1.2.1 Sense Mode

512 words are generated from the selected pattern, transmitted under sense mode, received under sense mode, and compared. This will cycle continuously until sense switch 3 is set. At which time the program, if in teletype mode, will type the number of passes and return to the pattern message.

1.2.2 BIC Mode

1.2.2.1 BIC Transmit

512 words are generated from the selected pattern, transmitted under BIC mode, received under sense mode, and compared. This will cycle continuously until sense switch 3 is set. At which time the program, if in teletype mode, will type the number of passes and return to the pattern message.

1.2.2.2 BIC Receive

512 words are generated from the selected pattern, transmitted under sense mode, received under BIC mode, and compared. This will cycle continuously until sense switch 3 is set. At which time the program, if in teletype mode, will type the number of passes and return to the pattern message.

1.2.3 PIM Mode

The program provides for operating under the program interrupt mode in either sense, BIC transmit or BIC receive. The program functions as above.



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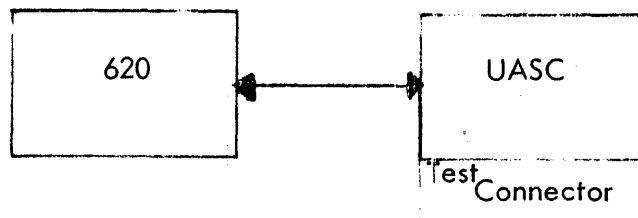
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1.3 HARDWARE SUMMARY

The normal minimum hardware configuration for the UASC test program is one 4K (minimum) 620 series computer, one ASR teletype (optional) and a UASC with test connector. No mainframe options or other peripherals are required.

In the absence of a teletype the program may be supplied in a form suitable for other input media (card reader, paper tape, etc.) and executed in the console mode.



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SECTION 2 EXTERNAL SPECIFICATIONS

2.1 GENERAL

The external specification provides all the operating procedures and information pertinent to user interface. The UASC test is normally loaded and executed via teletype keyboard commands from the user. The 620 Test Executive program is the software interface for accomplishing these functions.

2.2 LOADING PROCEDURE

The 620 Test Executive must be loaded before the UASC test program will operate correctly in either mode. All of the teletype input/output subroutines are resident in the Test Executive and will be called by the test program.

- a. Load the Test Executive, which includes the binary object tape loader, per the procedure outlined in the Test Executive external specifications, (89A0122).
- b. The individual test tapes begin with leader. Position the leader preceeding the test program in the reader.

2.3 OPERATING PROCEDURE

2.3.1 Teletype Mode

The 620 Test Executive must be in the teletype mode.

2.3.1.1 Loading the UASC Test

Type L. The test tape will be loaded, and execution will take place automatically.

2.3.1.2 Parameter Setup

Typeout: Universal Asynchronous Serial Controller Test
Response: (None)

Typeout: UASC DA
Response: A 2 digit octal number for the UASC device address followed by a comma or period. (If sense switch 3 is set, control is returned to the Exec.)



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Typeout: DATA LENGTH
 Response: A single digit number for data word length. (If SS3 is set, control is returned to the Exec.)

Typeout: PATTERN
 Response: A single alphabetic character. A for an alternating pattern, F for a fixed pattern, or I for an incrementing pattern followed by a 3 digit octal number for the initial pattern followed by a comma or period. NOTE: If the following conditions are not to be changed, type C for continue as the first and only character of this response. (If SS3 is set, control is returned to the UASC DA message.)

Typeout: PIM REQUIRED
 Response: A single alphabetic character. Y for yes, N for no (if SS3 is set, control is returned to the pattern message).

Typeout: PIM DA
 NOTE: If the response to PIM required is N, this message will not appear.
 NOTE: Once the PIM device address is input, this message will not appear unless the program is restarted from the beginning.
 Response: A 2 digit octal number for the PIM device address followed by a comma or period. (If SS3 is set, control is returned to the pattern message.)

Typeout: TX INT LOC
 NOTE: If the response to PIM REQUIRED is N, this message will not appear.
 Response: A 1 - 6 digit octal number for the transmit interrupt location.

Typeout: RX INT LOC
 NOTE: If the response to PIM required is N, this message will not appear.
 Response: A 1 - 6 digit octal number for the receive interrupt location.

Typeout: ER INT LOC
 NOTE: If the response to PIM required is N, this message will not appear.
 Response: A 1 - 6 digit octal number for the error interrupt location.

Typeout: MASK
 NOTE: If the response to PIM required is N, this message will not appear.
 Response: A 3 digit octal number for the PIM mask.



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Typeout: MODE
Response: Two alphabetic characters. SE for sense mode or BI for BIC mode. (If SS3 is set, control is returned to the pattern message.)

If Sense Mode is selected, no further setup is required.

Typeout: BIC DA
NOTE: Once the BIC device address is input, this message will not appear unless the program is restarted from the beginning.
Response: A 2 digit octal number for the BIC device address followed by a comma or period. (If SS3 is set, control is returned to the pattern message.)

Typeout: BIC DIRECTION
Response: A single alphabetic character. R for sense mode write, BIC mode read, T for BIC mode write, sense mode read. (If SS3 is set, control is returned to the pattern message.)

This completes the UASC setup.

2.3.2 Console Mode

The 620 Test Executive must be in the console mode (see section 2 of 89A0122).

2.3.2.1 Load the UASC Test

(See section 2 of 89A0122.)

2.3.2.2 Parameter Setup

Start the test at location 0500. Observe the U register for the appropriate halt instruction. At halt instruction 01 set A = UASC device address, and B = Data length (037 for 5 bit, 077 for 6 bit, 0177 for 7 bit, 0377 for 8 bit) press run. At halt instruction 02 set A = pattern type (0 = ALT, 06 = FIX, 011 = INC) and B = pattern configuration. Press run at halt instruction 03 set A = PIM device address (if no PIM is required set A = 0) press run. At halt instruction 04 (if PIM device address $\neq$ 0) set A = transmit interrupt location, B = receive interrupt location, and X = error interrupt location. Press Run. At halt instruction 5 set A = mode (0 = sense, 1 = BIC), B = BIC device address, X = BIC direction (0 = receive, 1 = transmit) press run. The program will run to halt instruction 0704 at which time the A register will be minus for a functioning sense option or the A register will be positive or zero for a non-functioning sense option. Press run to continue test.



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2.3.3 Operating in Sense Mode

A quick test of the UASC is made to determine if the data length is correct and to see if the sense option is functioning.

2.3.3.1 Method of Test

The program builds 512 words to be transmitted, outputs them and reads them back. When all 512 words have been read, a compare of transmitted to received data is made. Errors and malfunctions are reported to the operator via teletype messages or halts.

2.3.3.2 Messages and Their Meanings

Message: TRANSMIT NOT READY

Meaning: After initializing the controller the output section was not immediately ready.

Message: RECEIVE SHOULD NOT BE READY

Meaning: After initializing the controller the input section was immediately ready.

Message: LENGTH ERROR

Meaning: The length selected by the operator does not match that of the controller.

Message: NON-FUNCTIONING SENSE OPTION

Meaning: Either the sense option is not installed or the sense option is malfunctioning.

Message: FUNCTIONING SENSE OPTION

Meaning: The sense option is installed and functioning.

Message: CONTROLLER NOT READY

Meaning: A timeout has occurred while awaiting a response from the UASC.

Message: BUFFER SIZE ERROR

Meaning: The size of either the input or output buffers was not 512 words.

Message: ERROR i WORD j TX k RX l

Meaning: The read error status of the jth word was set (i = error: 1 = input overflow error, 2 = input parity error, 3 = input overflow error and input parity error, 4 = frame error or break, 5 = input overflow, error and frame error or break, 6 = input parity error and frame error or break, 7 = input overflow error and input parity error and frame error or break) k = the transmitted character, l = the



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received character.

Message: CMP ERR WORD j TX k RX l m
Meaning: A compare error at word j has occurred between the transmitted character k and the received character l with m being the exclusive ORing of the two characters.

2.3.4 Operating in BIC Mode

2.3.4.1 Operating in BIC Read Mode

A quick test of the UASC is made to determine if the data length is correct and to see if the sense option is functioning.

2.3.4.1.1 Method of Test

The program builds 512 words to be transmitted, outputs them and reads them back. When all 512 words have been read a compare of transmitted to received data is made. Errors and malfunctions are reported to the operator via teletype messages or halts.

2.3.4.1.2 Messages and Their Meanings

Message: TRANSMIT NOT READY
Meaning: After initializing the controller the output section was not immediately ready.

Message: RECEIVE SHOULD NOT BE READY
Meaning: After initializing the controller input section was immediately ready.

Message: LENGTH ERROR
Meaning: The length selected by the operator does not match that of the controller.

Message: NON-FUNCTIONING SENSE OPTION
Meaning: Either the sense option is not installed or the sense option is malfunctioning.

Message: FUNCTIONING SENSE OPTION
Meaning: The sense option is installed and functioning.



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Message: CONTROLLER NOT READY
Meaning: A timeout has occurred while awaiting a response from the UASC.

Message: BIC NOT READY
Meaning: A timeout has occurred while awaiting a response from the BIC.

Message: BIC ABNORMAL
Meaning: The BIC has reported an abnormal condition.

Message: BUFFER SIZE ERROR
Meaning: The size of either the input or output buffers was not 512 words.

Message: ERROR i WORD j TX k RX l
Meaning: The read error status of the jth word was set (i = error: 1 = input overflow error, 2 = input parity error, 3 = input overflow error and input parity error, 4 = frame error or break, 5 = input overflow, error and frame error or break, 6 = input parity error and frame error or break, 7 = input overflow error and input parity error and frame error or break) k = the transmitted character, l = the received character.

Message: CMP ERR WORD j TX k RX l m
Meaning: A compare error at word j has occurred between the transmitted character k and the received characters l with m being the exclusive ORing of the two characters.

2.3.4.2 Operating in BIC Write Mode

A quick test of the UASC is made to determine if the data length is correct and to see if the sense option is functioning.

2.3.4.2.1 Method of Test

The program builds 512 words to be transmitted, outputs them and reads them back. When all 512 words have been read a compare of transmitted to received data is made. Errors and malfunctions are reported to the operator via teletype messages or halts.

2.3.4.2.2 Messages and Their Meanings

Message: TRANSMIT NOT READY
Meaning: After initializing the controller the output section was not immediately ready.



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Message: RECEIVE SHOULD NOT BE READY
 Meaning: After initializing the controller, the input section was immediately ready.

Message: LENGTH ERROR
 Meaning: The length selected by the operator does not match that of the controller.

Message: NON-FUNCTIONING SENSE OPTION
 Meaning: Either the sense option is not installed or the sense option is malfunctioning.

Message: FUNCTIONING SENSE OPTION
 Meaning: The sense option is installed and functioning.

Message: CONTROLLER NOT READY
 Meaning: A timeout has occurred while awaiting a response from the UASC.

Message: BIC NOT READY
 Meaning: A timeout has occurred while awaiting a response from the BIC.

Message: BIC ABNORMAL
 Meaning: The BIC has reported an abnormal condition.

Message: BUFFER SIZE ERROR
 Meaning: The size of either the input or output buffers was not 512 words.

Message: ERROR i WORD j TX k RX l
 Meaning: The read error status of the jth word was set (i = error: 1 = input overflow error, 2 = input parity error, 3 = input overflow error and input parity error, 4 = frame error or break, 5 = input overflow, error and frame or break, 6 = input parity error and frame error or break, 7 = input overflow error and input parity error and frame error or break) k = the transmitted character, l = the received character.

Message: CMP ERR WORD j TX k RX l m
 Meaning: A compare error at word j has occurred between the transmitted character k and the received characters l with m being the exclusive ORing of the two characters.



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2.4 SENSE SWITCH SETTINGS

- Switch 1 off: Print all error messages.
on: Do not print routine error messages.
- Switch 2 off: Do not halt on 9 errors.
on: Halt when errors detected. (This halt will occur after the error message is typed if SS1 is off.)
- Switch 3 off: Normal operation.
on: Return as soon as possible to the pattern message or halt instruction 01 (see section 2.3.1.2).

2.5 MESSAGES

Universal Asynchronous Serial Controller Test
UASC DA
DATA LENGTH
PATTERN
PIM REQUIRED
PIM DA
XMIT INT LOC
RCVE INT LOC
ERR INT LOC
MASK
MODE
BIC DA
BIC DIRECTION
TRANSMIT NOT READY
RECEIVE SHOULD NOT BE READY
LENGTH ERROR
NON-FUNCTIONING SENSE OPTION
FUNCTIONING SENSE OPTION
BIC ABNORMAL
BIC NOT READY
BUFFER SIZE ERROR
CONTROLLER NOT READY
ERROR n WORD nnnnnn TX nnnnnn RX nnnnnn
CMP ERR WORD nnnnnn TX nnnnnn RX nnnnnn nnnnnn



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2.6 HALTS

<u>Instruction</u>	<u>Register Setting or Meaning</u>
01	Set A = UASC device address B = data length (037 = 5 bit, 077 = 6 bit, 0177 = 7 bit, 0377 = 8 bit)
02	Set A = pattern type (1 = alternating, 6 = fixed, 011 = incrementing) B = initial pattern configuration
03	Set A = PIM device address (if no PIM required, set A = 0)
04	This is an optional halt Set A = transmit interrupt location B = receive interrupt location X = error interrupt location
05	Set A = mode (0 = sense, 1 = BIC) B = BIC device address X = BIC direction (0 = receive, 1 = transmit)
040	"Controller not ready"
041	"Buffer size error"
042	"BIC not ready"
043	"BIC abnormal"
0102	"Hardware detected error" Read A = word within the buffer B = data word transmitted X = data word received with the flags in the most significant part of the word.
0103	"Compare error" Read A = word within the buffer B = data word transmitted C = data word received



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InstructionRegister Setting or Meaning

0700

Output not ready

0701

Input should not be ready

0702

Length error

0704

A < 0 Functioning sense option

A > 0 Non-functioning sense option

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SECTION 3 INTERNAL SPECIFICATION

3.1 COMPONENT SPECIFICATIONS

Title: Sense Switch 3 Return

Symbolic Name: SS3R

Purpose: Termination of Test

Description: If in teletype mode, type out the octal number of passes mode through the previous test. If in console mode, returns to initial parameter setup.

Entry Points: SS3R

Calling Sequence: JSS3 SS3R

Entrance Parameters: None

Exit Point: CMOD or TM5

Exit Parameters: Not applicable

Table or Files Modified or Read: Pass is set to zero.

Tables or Files Created: Not applicable

Called By: OUTC, OUTE, OUTD

Called From: SENM, BICW, BICR, QKY, SCK

Exception Conditions: Not applicable

Timing: Not applicable

Size: 26 octal words



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Title: Console Mode Parameter Input
Symbolic Name: CMOD
Purpose: Set up parameter values from the console.
Description: The routine clears all registers and halts at various points to allow for operator inputs.
Entry Points: CMOD, CMO, CM2, CM3
Calling Sequence: LDA \$CON
JAZ CMOD
Entrance Parameters: Not applicable
Exit Point: SENM, BICR, BICW
Exit Parameters: Operating parameters
Tables or Files Modified or Read: DA, DLGH, PATT, PTRN, PDA, PIMR, BDA, MASK
Tables or Files Created: Not applicable
Called By: TDA, TPDA, SETI, TBDA
Called From: Start and end of test.
Exception Conditions: Not applicable
Timing: Not applicable
Size: 65 octal words



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Title: Teletype Mode Parameter Input
Symbolic Name: TMOD
Purpose: Set up parameter values from the teletype.
Description: The routine asks for and accepts parameter values from the operator.
Entry Points: TMOD, TDA, TM5, TPDA, TBDA
Calling Sequence: JMP TMOD
Entrance Parameters: Not applicable
Exit Point: SENM, BICR, BICW
Exit Parameters: Operating parameters
Tables or Files Modified or Read: DA, DLGH, PATT, PTRN, PDA, PIMR, BDA, MASK
Tables or Files Created: Not applicable
Called By: INPB, INPE, INPG, OCT1, OUTD, SETI
Called From: SS3R, Start and end of test.
Exception Conditions: Not applicable
Timing: Not applicable
Size: 642 octal words



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Title: Sense In, Sense Out Mode
 Symbolic Name: SENM
 Purpose: Test the UASC in sense mode with or without PIM.
 Description: Outputs 512 words of data, inputs 512 words of data, and monitors and flags hardware errors.
 Entry Points: SENM
 Calling Sequence: JMP SENM
 Entrance Parameters: Operating parameters.
 Exit Point: SCK, SS3R
 Exit Parameters: Not applicable
 Tables or Files Modified or Read: JUMP, U1, U2, PIM BI
 Tables or Files Created: Not applicable
 Called By: QKY, FOB, IPIM, TOUT, CUR, BSE
 Called From: CMOD, TMOD
 Exception Conditions: Not applicable
 Timing: Approximately 514 decimal UASC word times.
 Size: 151 octal words



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Title: Sense In, BIC Out
 Symbolic Name: BICW
 Purpose: Test the UASC using sense in mode and BIC out mode with or without PIM.
 Description: Outputs 512 words of data, inputs 512 words of data, and monitors and flags hardware errors.
 Entry Points: BICW
 Calling Sequence: JMP BICW
 Entrance Parameters: Operating parameters
 Exit Point: SCK, SS3R
 Exit Parameters: Not applicable
 Tables or Files Modified or Read: JUMP, U1, PIM, BI
 Tables or Files Created: Not applicable
 Called By: QKY, FOB, IPIM, TOUT, BNR, CNR, BAB, BSE
 Called From: CMOD, TMOD
 Exception Conditions: Not applicable
 Timing: Approximately 514 decimal UASC word times.
 Size: 175 octal words



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Title: BIC In, Sense Out
Symbolic Name: BICR
Purpose: Test the UASC using BIC in mode and sense out mode with or without PIM.
Description: Outputs 512 words of data, inputs 512 words of data, and monitors and flags hardware errors.
Entry Points: BICR
Calling Sequence: JMP BICR
Entrance Parameters: Operating parameters
Exit Point: SCK, SS3R
Exit Parameters: Not applicable
Tables or Files Modified or Read: JUMP, U2, PIM, BI
Tables or Files Created: Not applicable
Called By: QKY, FOB, IPIM, TOUT, BNR, CNR, BAB, BSE, BERR
Called From:
Exception Conditions: Not applicable
Timing: Approximately 514 decimal UASC word times.
Size: 174 octal words



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Title: Data check
 Symbolic Name: SCK
 Purpose: To check the input buffer for error flags and to compare output to input data.
 Description: Not applicable
 Entry Points: SCK
 Calling Sequence: JMP SCK
 Entrance Parameters: Not applicable
 Exit Point: Return to the contents of JUMP.
 Exit Parameters: Not applicable
 Tables or Files Modified or Read: BI, BO
 Tables or Files Created: Not applicable
 Called By: OUTD, OUTA, OUTE
 Called From: SENM, BICW, BICR
 Exception Conditions: Routine halts on errors if SS2 set or in console mode.
 Timing: Not applicable
 Size: 240 octal words



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Title: BIC abnormal typeout
 Symbolic Name: BAB
 Purpose: Type the message "BIC ABNORMAL".
 Description: Not applicable
 Entry Points: BAB
 Calling Sequence: JMPM BAB
 Entrance Parameters: Not applicable
 Exit Point: Return to caller.
 Exit Parameters: Not applicable
 Tables or Files Modified or Read: Not applicable
 Tables or Files Created: Not applicable
 Called By: OUTD
 Called From: BICU, BICR
 Exception Conditions: No type out if SS1 on. Halt instruction 043 if SS1 on or in console mode.
 Timing: Not applicable
 Size: 31 octal words



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Title: BIC read error
Symbolic Name: BERR
Purpose: Place flags in the input buffer.
Description: The flag in the B register is ORed into the current BIC address less 1.
Entry Points: BERR
Calling Sequence: LDBI FLAG
JMPM BERR
Entrance Parameters: Not applicable
Exit Points: Return to caller
Exit Parameters: Not applicable
Tables or Files Modified or Read: BI
Tables or Files Created: Not applicable
Called By: Not applicable
Called From: BICR
Exception Conditions: Not applicable
Timing: Not applicable
Size: 12 octal words



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Title: BIC not ready type out
 Symbolic Name: BNR
 Purpose: Type the message "BIC NOT READY"
 Description: Not applicable
 Entry Points: BNR
 Calling Sequence: JMPM BNR
 Entrance Parameters: Not applicable
 Exit Point: Return to caller
 Exit Parameters: Not applicable
 Tables or Files Modified or Read: Not applicable
 Tables or Files Created: Not applicable
 Called By: OUTD
 Called From: BICW, BICR
 Exception Conditions: No typeout if SS1 on, halt instruction 042 if SS2 on or in console mode.
 Timing: Not applicable
 Size: 33 octal words



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Title: Buffer size error type out
Symbolic Name: BSE
Purpose: Type the message "BUFFER SIZE ERROR"
Description: Not applicable
Entry Points: BSE
Calling Sequence: JMPM BSE
Entrance Parameters: Not applicable
Exit Point: Return to caller
Exit Parameters: Not applicable
Tables or Files Modified or Read: Not applicable
Tables or Files Created: Not applicable
Called By: OUTD
Called From: SENM, BICW, BICR
Exception Conditions: No type out if SS1 on, halt instruction 041 if SS2 on if in console mode.
Timing: Not applicable
Size: 34 octal words



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Title: Controller not ready type out
 Symbolic Name: CNR
 Purpose: Type the message "CONTROLLER NOT READY"
 Description: Not applicable
 Entry Points: CNR
 Calling Sequence: JPM CNR
 Entrance Parameters: Not applicable
 Exit Point: Return to caller
 Exit Parameters: Not applicable
 Tables or Files Modified or Read: Not applicable
 Tables or Files Created: Not applicable
 Called By: OUTD
 Called From: SENM, BICW, BICR, QKY
 Exception Conditions: No type out if SS1 on, halt instruction 040 if SS2 on or in console mode.
 Timing: Not applicable
 Size: 42 octal words



varian data machines

CODE
 IDENT NO
21101

89A0228

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A
 REV

Title: Set in device address
Symbolic Name: DVAD
Purpose: To place the device address into referenced I/O instructions.
Description: The routine picks up the referenced I/O instruction, masks out the device address, replaces it with the referenced device address, and restores the instruction.
Entry Points: DVAD
Calling Sequence: JMPM DVAD
DATA DEVICEADDRESSLOCATION
DATA I/OINSTRUCTION, I/O INSTRUCTION
DATA 0
Entrance Parameters: Not applicable
Exit Point: Return to caller following the DATA 0.
Exit Parameters: Not applicable
Tables or Files Modified or Read: Referenced I/O instructions
Tables or Files Created: Not applicable
Called By: Not applicable
Called From: TMOD
Exception Conditions: Not applicable
Timing: Not applicable
Size: 24 octal words



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CODE
IDENT NO.
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A1
REV

Title: Fill output buffer
 Symbolic Name: FOB
 Purpose: Fill the output buffer with the requested data pattern.
 Description: Not applicable
 Entry Points: FOB
 Calling Sequence: JPM FOB
 Entrance Parameters: Not applicable
 Exit Point: Return to caller
 Exit Parameters: Not applicable
 Tables or Files Modified or Read: BO
 Tables or Files Created: Not applicable
 Called By: Not applicable
 Called From: SENM, BICW, BICR
 Exception Conditions: Not applicable
 Timing: Not applicable
 Size: 21 octal words



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REV

Title:	Get next character to transmit
Symbolic Name:	GNCX
Purpose:	Return a 16 bit data word, and update for the next call according to the pattern type.
Description:	Not applicable
Entry Points:	GNCX
Calling Sequence:	JMPM GNCX
Entrance Parameters:	Not applicable
Exit Point:	Return to caller
Exit Parameters:	Data word in B
Tables or Files Modified or Read:	PTRN
Tables or Files Created:	Not applicable
Called By:	Not applicable
Called From:	FOB
Exception Conditions:	Not applicable
Timing:	Not applicable
Size:	22 octal words



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A
REV

Title: Initialize PIM
 Symbolic Name: IPIM
 Purpose: Initialize the PIM if required.
 Description: Not applicable
 Entry Points: IPIM
 Calling Sequence: JMPM IPIM
 Entrance Parameters: Not applicable
 Exit Point: Return to caller
 Exit Parameters: Not applicable
 Tables or Files Modified or Read: PIM
 Tables or Files Created: Not applicable
 Called By: Not applicable
 Called From: SENM, BICW, BICR
 Exception Conditions: Not applicable
 Timing: Not applicable
 Size: 15 octal words



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Title: Accept an octal input from teletype
 Symbolic Name: OCTI
 Purpose: Type the parameter message and accept an octal number.
 Description: Not applicable
 Entry Points: OCTI
 Calling Sequence: LDXI MESSAGE
 JMPM OCTI
 STA NUMBER
 Entrance Parameters: X = MESSAGE ADDRESS
 Exit Point: Return to caller to RM5
 Exit Parameters: A = NUMBER
 Tables or Files Modified or Read: Not applicable
 Tables or Files Created: Not applicable
 Called By: OUTD, INPG
 Called From: TMOD
 Exception Conditions: SS3 will cause return to TM5
 Timing: Not applicable
 Size: 16 octal words



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89A0228

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H
REV

Title: PIM interrupt
 Symbolic Name: PIMI
 Purpose: Process a PIM interrupt
 Description: Decrement PIM for each interrupt
 Entry Points: PIMI
 Calling Sequence: Interrupt driven routine
 JMPM PIMI
 Entrance Parameters: Not applicable
 Exit Point: Returns to interrupted routine.
 Exit Parameters: Not applicable
 Tables or Files Modified or Read: Not applicable
 Tables or Files Created: Not applicable
 Called By: Not applicable
 Called From: Not applicable
 Exception Conditions: Not applicable
 Timing: Not applicable
 Size: 12 octal words



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REV

Title: Quick test of the UASC
Symbolic Name: QKY
Purpose: Provides a quick test of operation, data length and sense option.
Description: Not applicable
Entry Points: QKY
Calling Sequence: JPM QKY
Entrance Parameters: Not applicable
Exit Point: Return to caller
Exit Parameters: Not applicable
Tables or Files Modified or Read: Not applicable
Tables or Files Created: Not applicable
Called By: TYPE, TOUT, CNR, OUTC, OUTD
Called From: SENM, BICW, BICR
Exception Conditions: If an error occurs, the routine will halt. If in console mode, routine will halt after testing the sense option.
Timing: Not applicable
Size: 63 octal words



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A

REV

Title: Set PIM interrupt words
 Symbolic Name: SETI
 Purpose: To place a 'JMPM PIMI' in the PIM interrupt locations.
 Description: Not applicable
 Entry Points: SETI
 Calling Sequence: LDA INTERRUPTLOCATION
 JMPM SETI
 Entrance Parameters: A = INTERRUPT LOCATION
 Exit Point: Return to caller
 Exit Parameters: Not applicable
 Tables or Files Modified or Read: PIM INTERRUPT LOCATIONS
 Tables or Files Created: Not applicable
 Called By: Not applicable
 Called From: TMOD, CMOD
 Exception Conditions: Not applicable
 Timing: Not applicable
 Size: 11 octal words



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REV

Title:	Type the messages in X
Symbolic Name:	TYPE
Purpose:	Type the message pointed to by the X register.
Description:	Not applicable
Entry Points:	TYPE
Calling Sequence:	LDXI MESSAGE JMPM TYPE
Entrance Parameters:	X = MESSAGE ADDRESS
Exit Point:	Return to caller
Exit Parameters:	Not applicable
Tables or Files Modified or Read:	Not applicable
Tables or Files Created:	Not applicable
Called By:	OUTD
Called From:	QKY
Exception Conditions:	If \$CON is zero (console mode), there is no type out.
Timing:	Not applicable
Size:	10 octal words



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A
REV

PROGRAMMER	PROGRAM NO.	DATE	PAGE 01
CHART I.D.		CHART NAME	
PROGRAM NAME			


```

graph TD
    UASC([UASC]) --> SCIN1{SCIN}
    SS3R([SS3R]) --> SCIN2{SCIN}
    SCIN1 -- "00" --> CMOD([CMOD])
    SCIN1 -- "01" --> TMD([TMD])
    CMOD --> A2_02[A2 02]
    SCIN2 -- "00" --> CMOD
    SCIN2 -- "01" --> OUTC{{OUTC}}
    OUTC --> OUTB{{OUTB}}
    OUTB --> PASS3{{PASS}}
    PASS3 --> OUT2{{OUT2}}
    OUT2 --> PASS4[PASS ← 0]
    PASS4 --> SS3{SS3}
    SS3 -- "ON" --> SS3
    SS3 -- "OFF" --> TMS([TMS])
    TMS --> A2_05[A2 05]
    
```


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PROGRAMMER	PROGRAM NO.	DATE	PAGE 02
CHART I.D.	CHART NAME	PROGRAM NAME	

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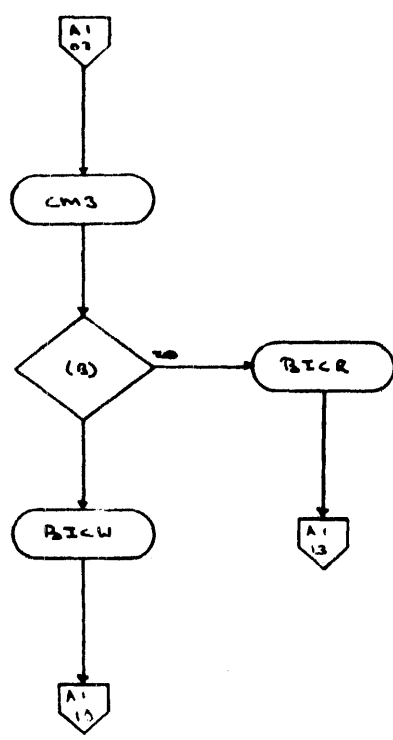
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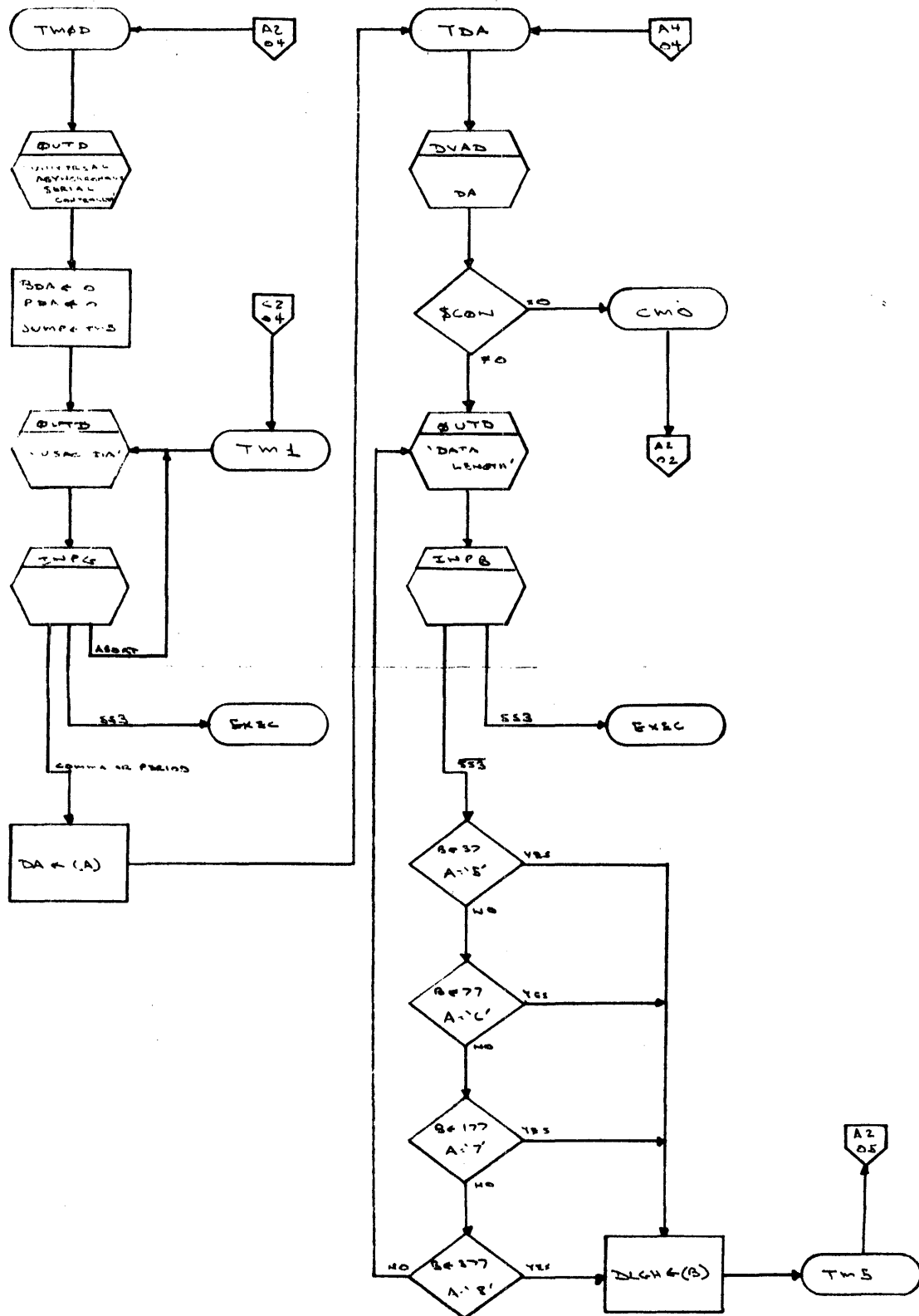
PROGRAMMER	PROGRAM NO.	DATE	PAGE C3
CHART I.D.	CHART NAME	PROGRAM NAME	

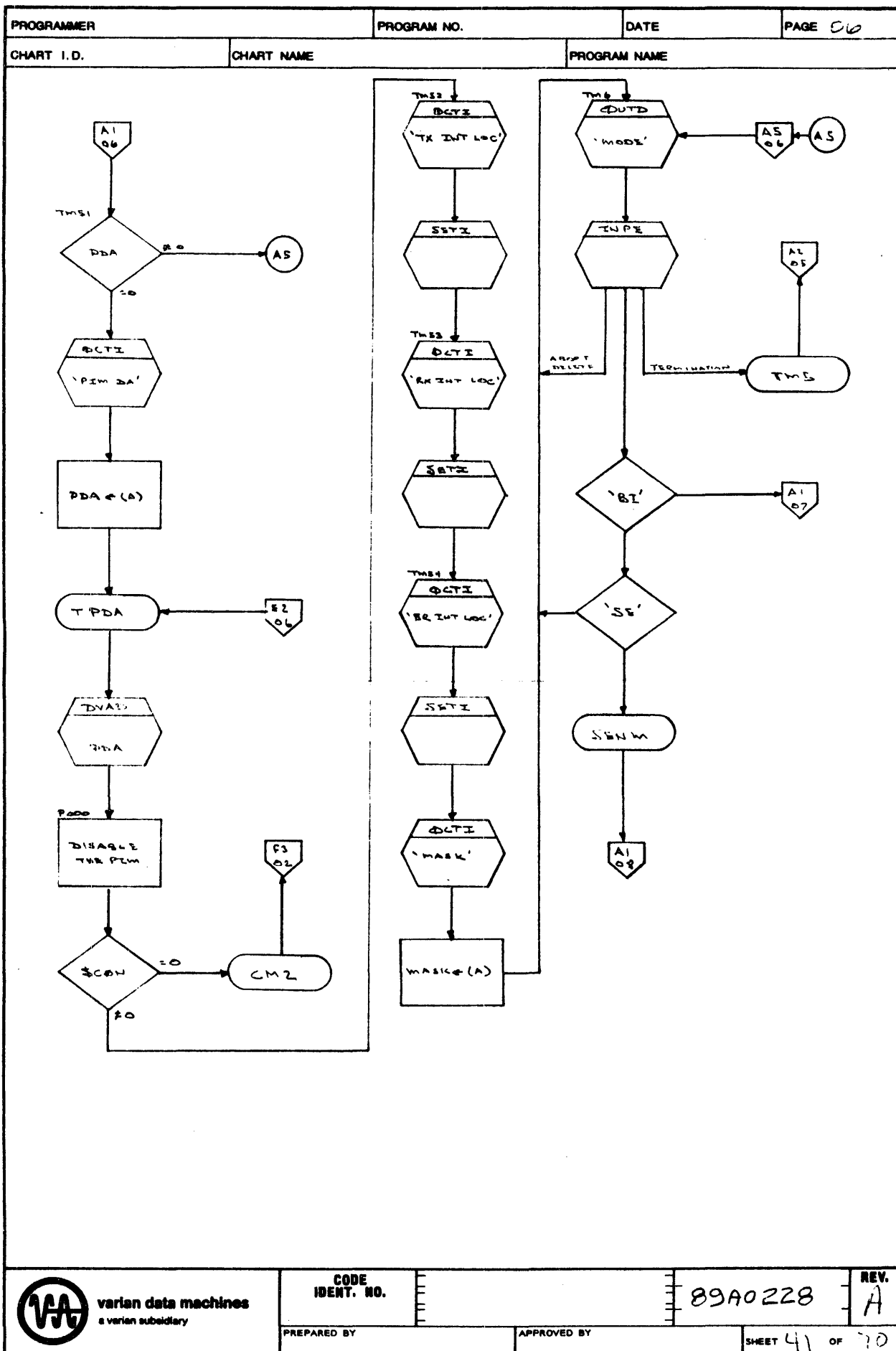


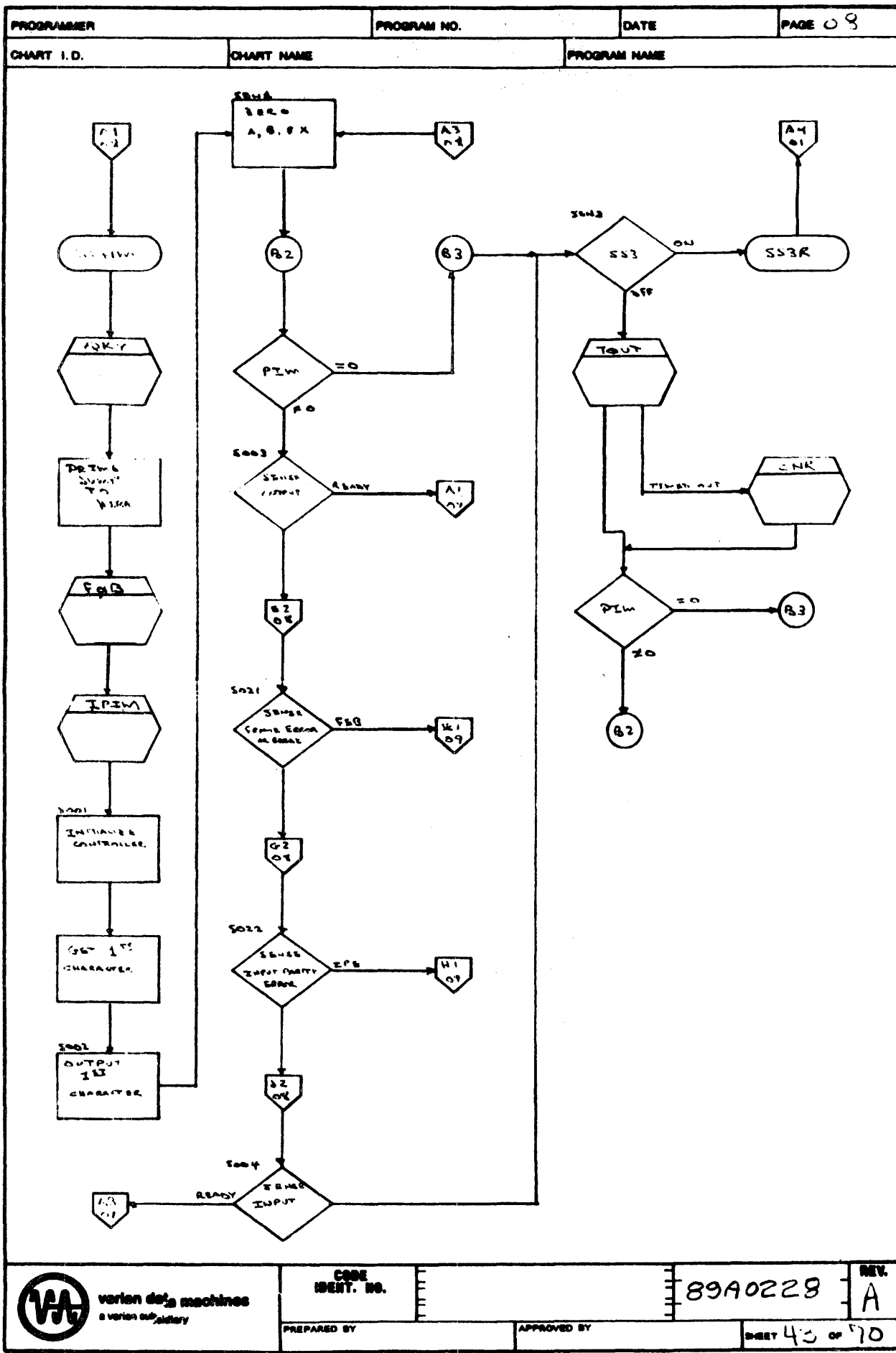
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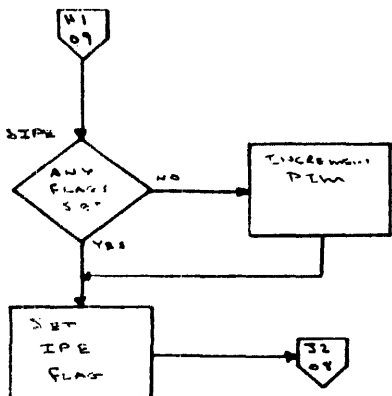
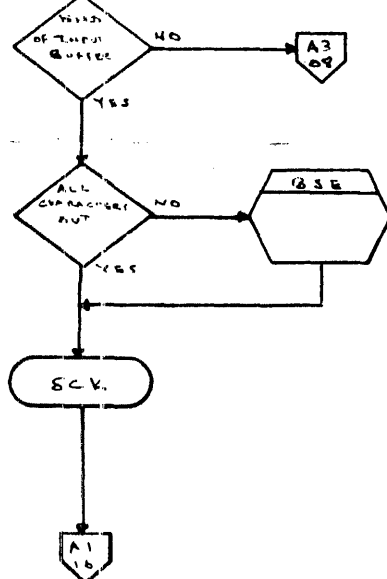
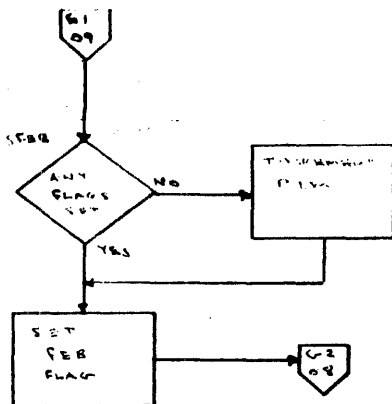
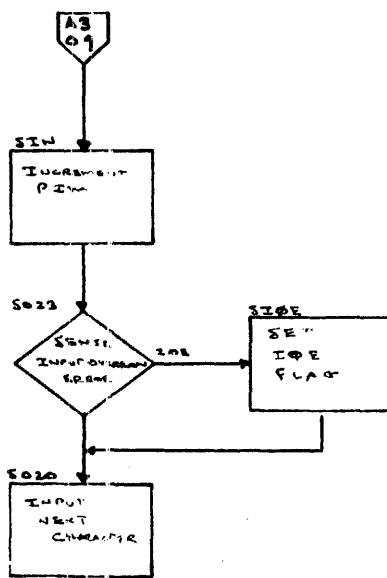
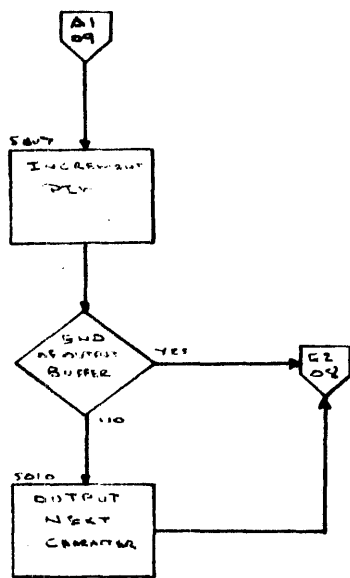
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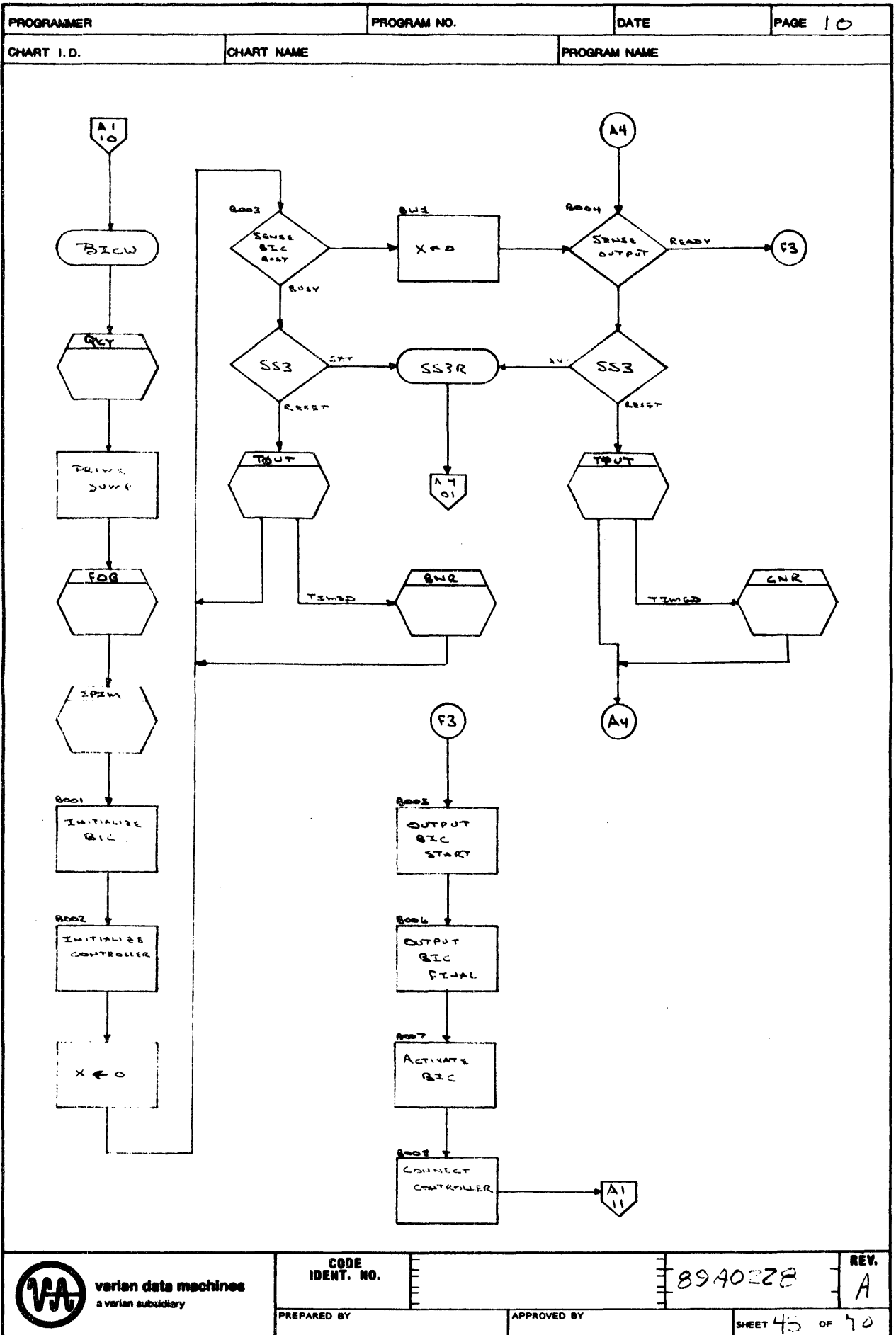
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8940228

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PROGRAMMER	PROGRAM NO.	DATE	PAGE 12
CHART I.D.	CHART NAME	PROGRAM NAME	

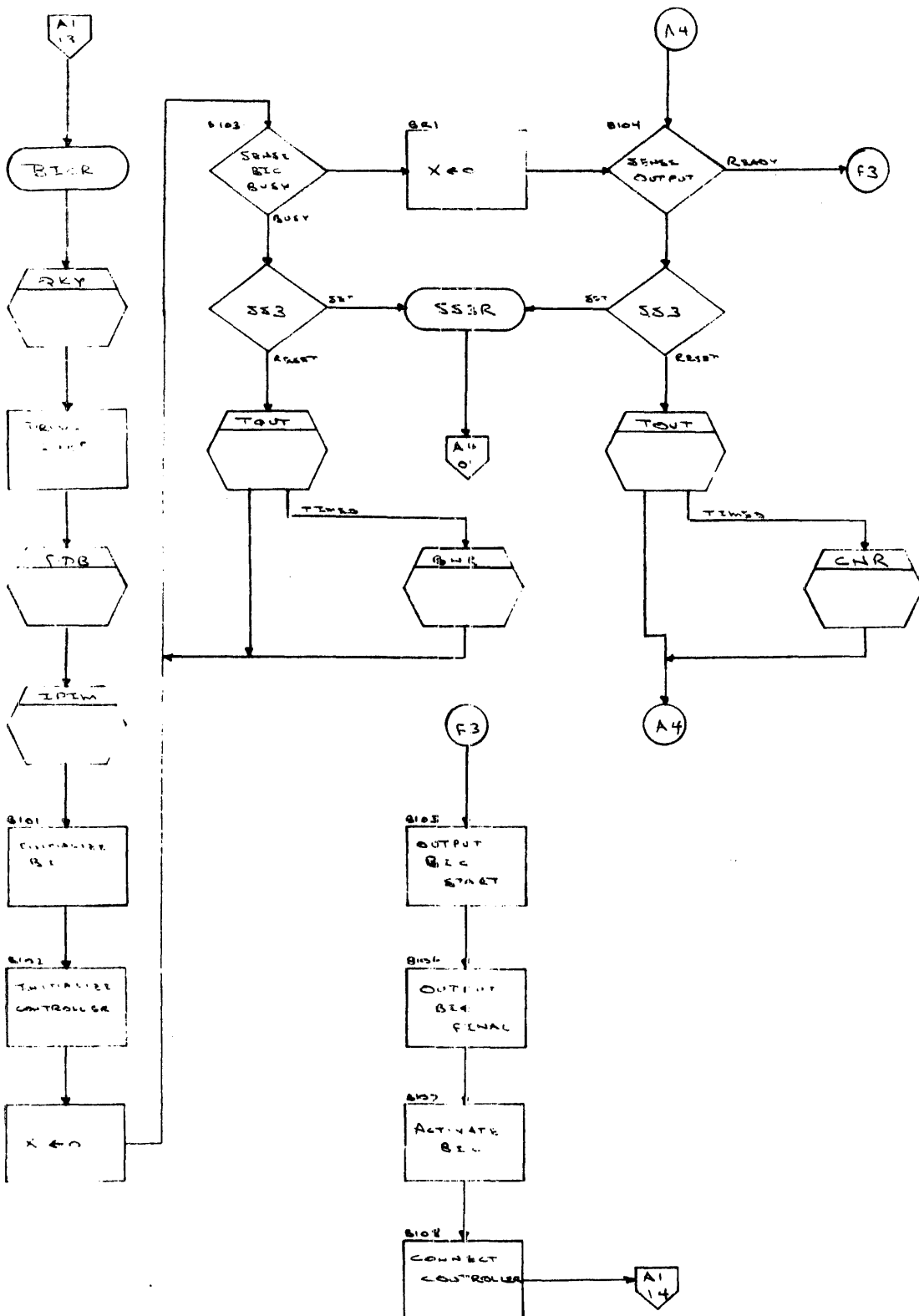
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```

graph TD
    A112[A112] --> B110000[B110000 F-1111]
    B110000 -- NO --> A111[A111]
    B110000 -- YES --> B0224[B0224]
    B0224 --> B111111_READY{B111111 READY}
    B111111_READY -- NO --> B111111[B111111]
    B111111_READY -- YES --> B0225[B0225]
    B0225 --> B111111_ABNORMAL{B111111 ABNORMAL}
    B111111_ABNORMAL -- YES --> B111111
    B111111_ABNORMAL -- NO --> B0226[B0226]
    B0226 --> B111111_C111111{B111111 C-111111}
    B111111_C111111 -- NO --> B111111
    B111111_C111111 -- YES --> SCK([SCK])
    SCK --> A116[A116]
  
```

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PROGRAMMER	PROGRAM NO.	DATE	PAGE 15
CHART I.D.	CHART NAME	PROGRAM NAME	

```

graph TD
    A15{{A1  
15}} --> X0[X ← 0]
    X0 --> INCREMENT[INCREMENT  
PLV]
    INCREMENT --> OUTPUT[OUTPUT  
CHARACTER]
    OUTPUT --> LAST{LAST}
    LAST -- NO --> A114{{A1  
14}}
    LAST -- YES --> BICREADY{BIC  
READY}
    BICREADY -- YES --> BICCHECK{BIC  
CHECK  
ABNORMAL}
    BICCHECK -- YES --> BAB{{BAB}}
    BICCHECK -- NO --> BICCHECK2{BIC  
CHECK  
FATAL}
    BICCHECK2 -- NO --> BSE{{BSE}}
    BICCHECK2 -- YES --> SCK([SCK])
    SCK --> A116{{A1  
16}}
    BICREADY -- NO --> SS3{SS3}
    SS3 -- SET --> SS3R([SS3R])
    SS3R --> A1101{{A1  
01}}
    SS3 -- RESET --> TOUT{{TOUT}}
    TOUT -- TZWED --> BNR{{BNR}}
    BNR --> LAST
  
```

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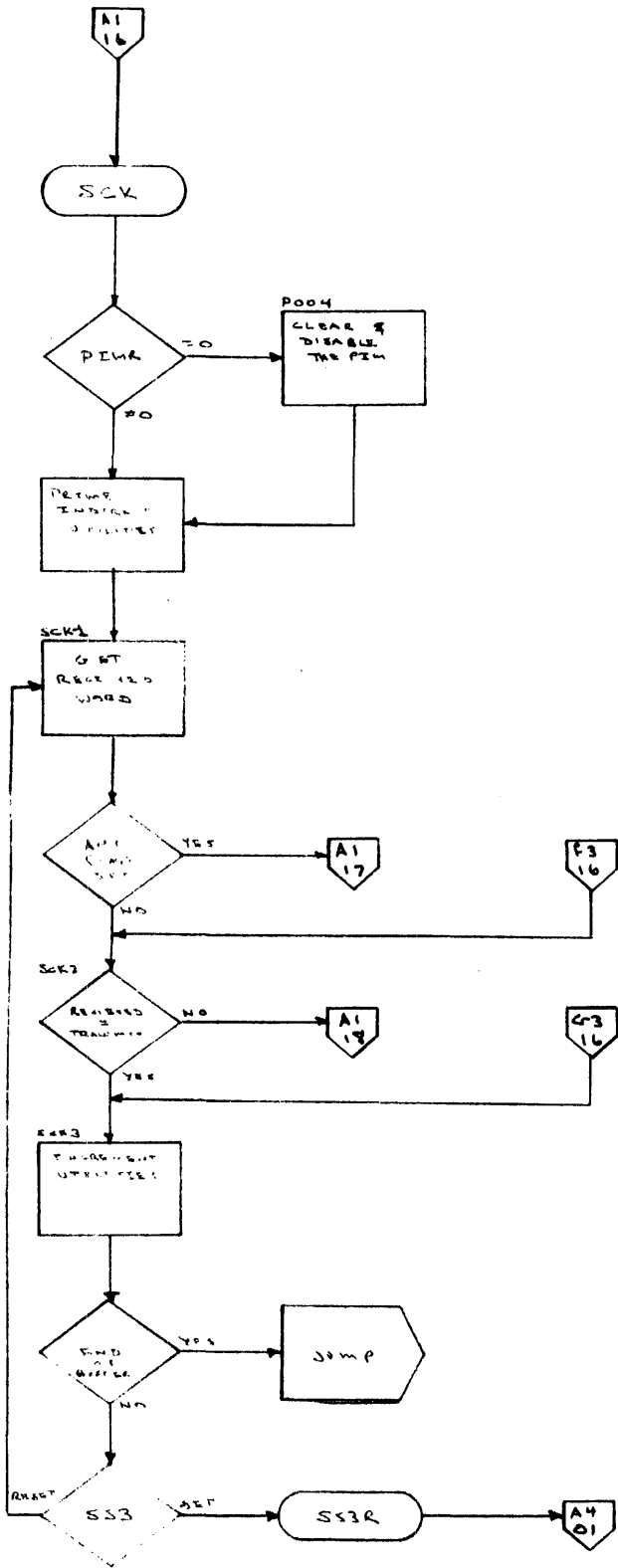
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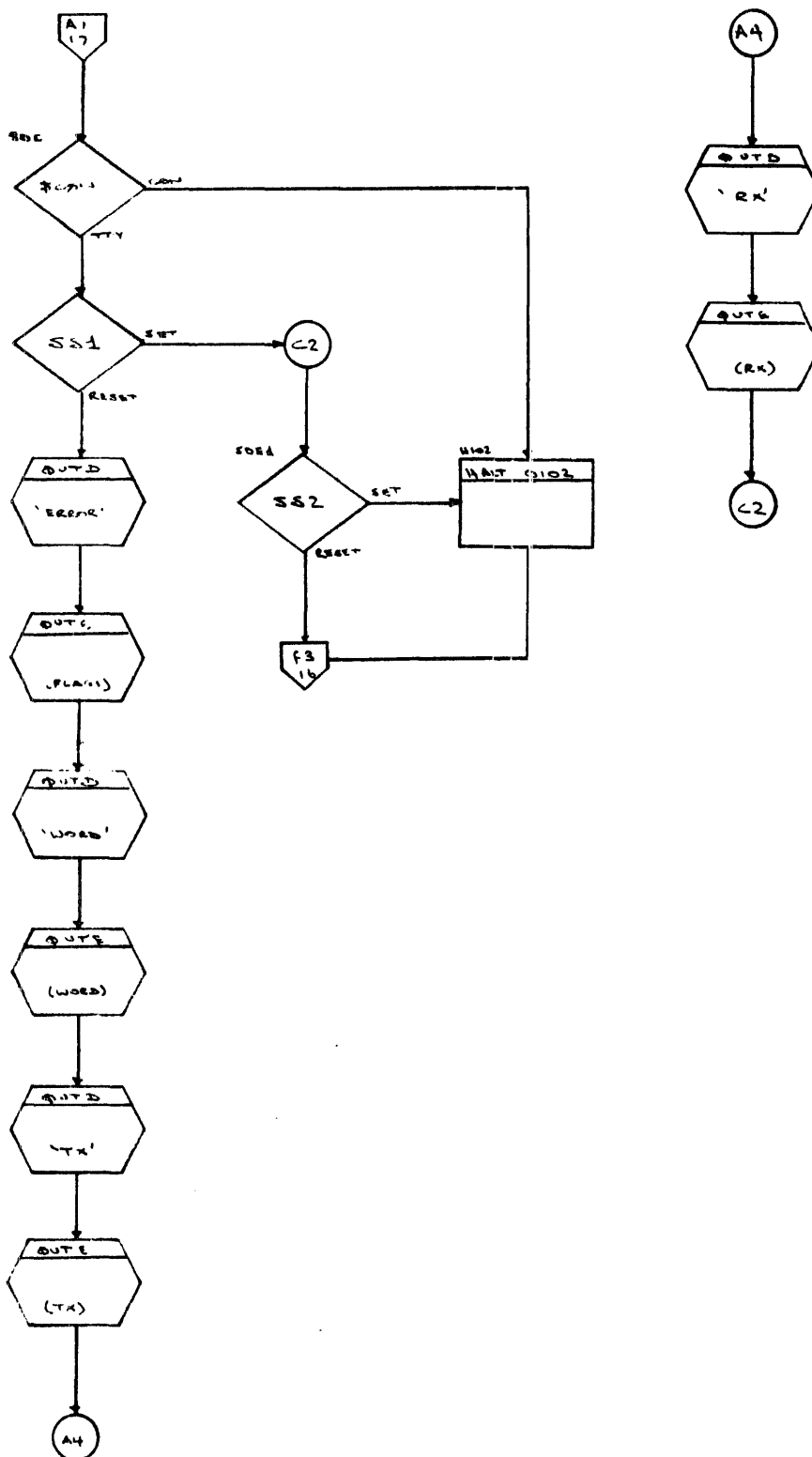
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PROGRAMMER		PROGRAM NO.		DATE	PAGE 18
CHART I.D.		CHART NAME		PROGRAM NAME	

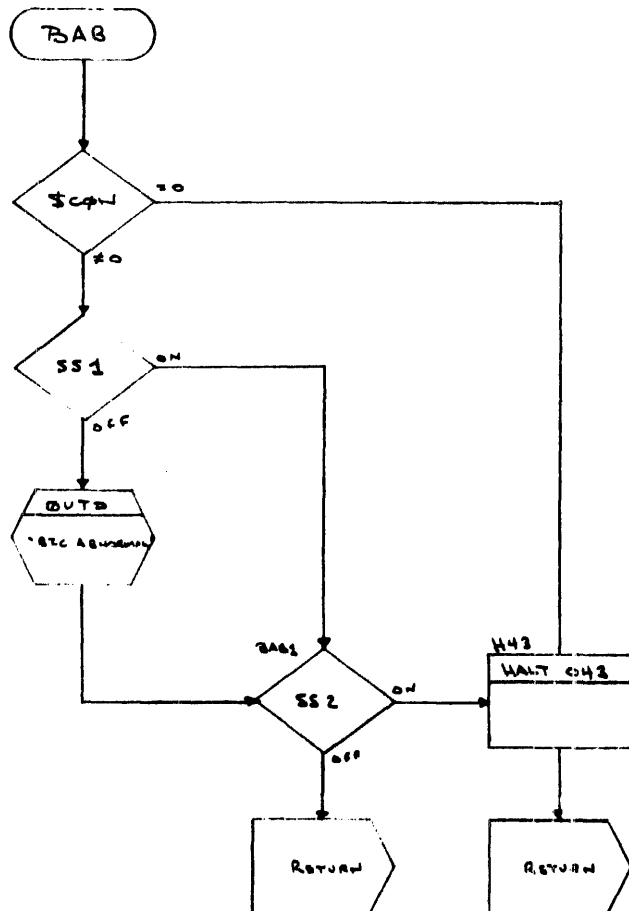
```

graph TD
    Start([A1  
14]) --> D1{ }
    D1 -- CON --> Halt([HALT 0103])
    D1 -- TRY --> D2{SS1}
    D2 -- SET --> D3{SS2}
    D2 -- RESET --> Out1[/OUT 1  
'CWP 224  
W 0.00'/]
    D3 -- SET --> Halt
    D3 -- RESET --> G3In{{G3  
IN}}
    Out1 --> Out2[/OUT 2  
(WIND)/]
    Out2 --> Out3[/OUT 3  
(TX)/]
    Out3 --> Out4[/OUT 4  
(TX)/]
    Out4 --> Out5[/OUT 5  
'RX'/]
    Out5 --> Out6[/OUT 6  
(RX)/]
    Out6 --> Out7[/OUT 7  
(RX) * (TX)/]
    Out7 --> G3Out{{G3  
OUT}}
    
```

	CODE IDENT. NO. 	REV. A	30A0228
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PROGRAMMER		PROGRAM NO.		DATE	PAGE 20
CHART I.D.		CHART NAME		PROGRAM NAME	

```

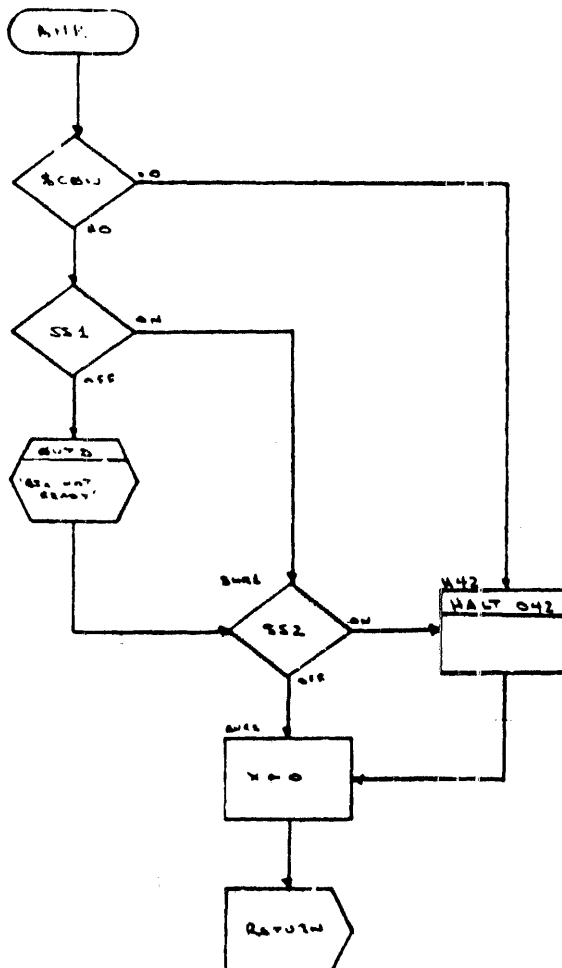
graph TD
    BE[R]([BE R]) --> S[SAVE FLAG]
    S --> G[GET CURRENT  
EXT. USED  
ADDRESS]
    G --> D[DECREMENT  
BY 1]
    D --> D1{ANY  
EXT. USED  
ADDRESS}
    D1 -- YES --> S1[DECREMENT  
EXT. USED]
    D1 -- NO --> S2[DECREMENT  
BY 1]
    S1 --> R[/RETURN/]
    S2 --> D
          
```

	CODE IDENT. NO.	REV. A	09A0220
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PROGRAMMER	PROGRAM NO.	DATE	PAGE 21
CHART I.D.	CHART NAME	PROGRAM NAME	



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PROGRAMMER	PROGRAM NO.	DATE	PAGE 22
CHART I.D.	CHART NAME	PROGRAM NAME	

BSE

↓

3C41

↓

SS1

↓

OUTD

↓

SS2

↓

RETURN

0

↓

SS2

↓

HAUT 041

↓

RETURN

ON

↓

HAUT 041

↓

RETURN

OFF

↓

RETURN

ON

↓

HAUT 041

↓

RETURN

OFF

↓

RETURN



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PROGRAMMER	PROGRAM NO.	DATE	PAGE 23
CHART I.D.	CHART NAME	PROGRAM NAME	


```

graph TD
    CNR((CNR)) --> SCPH{SCPH}
    SCPH -- "=0" --> HALT1[HALT 040]
    SCPH -- "≠0" --> SS1{SS1}
    SS1 -- "ON" --> HALT2[HALT 040]
    SS1 -- "OFF" --> OUTD{{OUTD  
CONTROLLER NOT READY}}
    OUTD --> SS2{SS2}
    SS2 -- "ON" --> HALT3[HALT 040]
    SS2 -- "OFF" --> XNE0[X ≠ 0]
    XNE0 --> RETURN[/RETURN/]
  
```

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00A0040-000A

PROGRAMMER	PROGRAM NO.	DATE	PAGE 24
CHART I.D.	CHART NAME	PROGRAM NAME	

START

↓

INITIALIZE ADDRESS

↓

STEP POINTER

↓

GET INSTRUCTION ADDRESS

↓

IA = 0

↓ YES

RETURN

↓ NO

GET INSTRUCTION

↓

AND IN INSTRUCTION ADDRESS

↓

RESTORE INSTRUCTION

↑

STEP POINTER



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PROGRAMMER	PROGRAM NO.	DATE	PAGE 25
CHART I.D.	CHART NAME	PROGRAM NAME	


```

graph TD
    Start([F00]) --> Step1[STEP DATA COUNTER]
    Step1 --> Step2[PRIME INVERT]
    Step2 --> LoopStart[FOR I]
    LoopStart --> Step3[SAVE INVERT WITH CHARACTER]
    Step3 --> Step4[SAVE IN ALPHABET]
    Step4 --> Step5[STEP COUNTER]
    Step5 --> Decision{BUFFER FULL}
    Decision -- NO --> LoopStart
    Decision -- YES --> End([RETURN])
  
```


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PROGRAMMER	PROGRAM NO.	DATE	PAGE 26
CHART I.D.	CHART NAME	PROGRAM NAME	

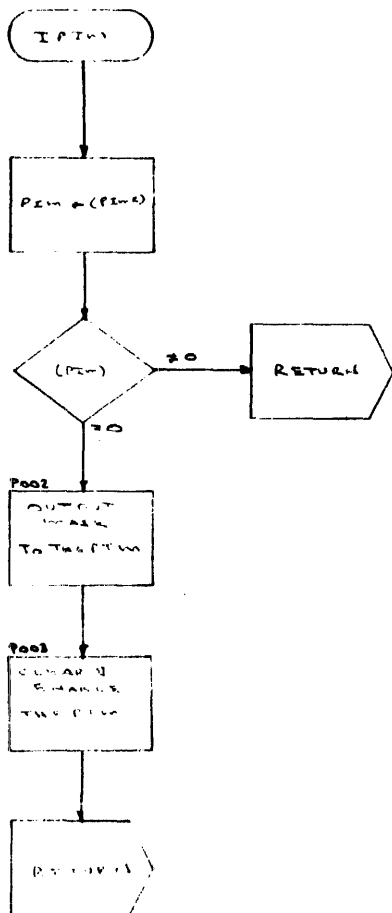
```

graph TD
    Start([START]) --> N_ptr[N ← (PTR N)]
    N_ptr --> X_A[X ← (A)]
    X_A --> X_Z[X ← (Z)]
    X_Z --> DecA{ (PTR) = A }
    DecA -- YES --> PrintX1[PRINT (X)]
    DecA -- NO --> X_plus1[X ← (X) + 1]
    X_plus1 --> Dec1{ (PTR) = 1 }
    Dec1 -- YES --> PrintX2[PRINT (X)]
    Dec1 -- NO --> X_minus1[X ← (X) - 1]
    X_minus1 --> G_plus1[G ← 1]
    G_plus1 --> PrintX3[PRINT (X)]
    PrintX3 --> RETURN([RETURN])
    PrintX1 --> PrintX3
  
```

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98A0545-000A

PROGRAMMER	PROGRAM NO.	DATE	PAGE 27
CHART I. D.	CHART NAME	PROGRAM NAME	



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 varien data machines a varien subsidiary	CODE IDENT. NO.	89A0228	REV. A
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PROGRAMMER	PROGRAM NO.	DATE	PAGE 28
CHART I.D.	CHART NAME	PROGRAM NAME	

START

↓

SAVE (X)

↓

RESTORE X

↓

OUTD

↓

WEG

↓

INPG

↓

ABORT

↓

TERMINATE

↓

TMS

↓

END

↑

↓

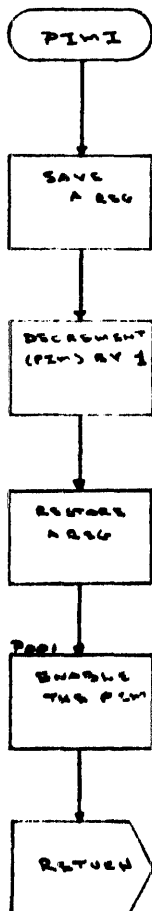
COMMON PRIORITY

↓

RETURN

varien data machines a varien subsidiary	CODE IDENT. NO.	89A0228	REV. A
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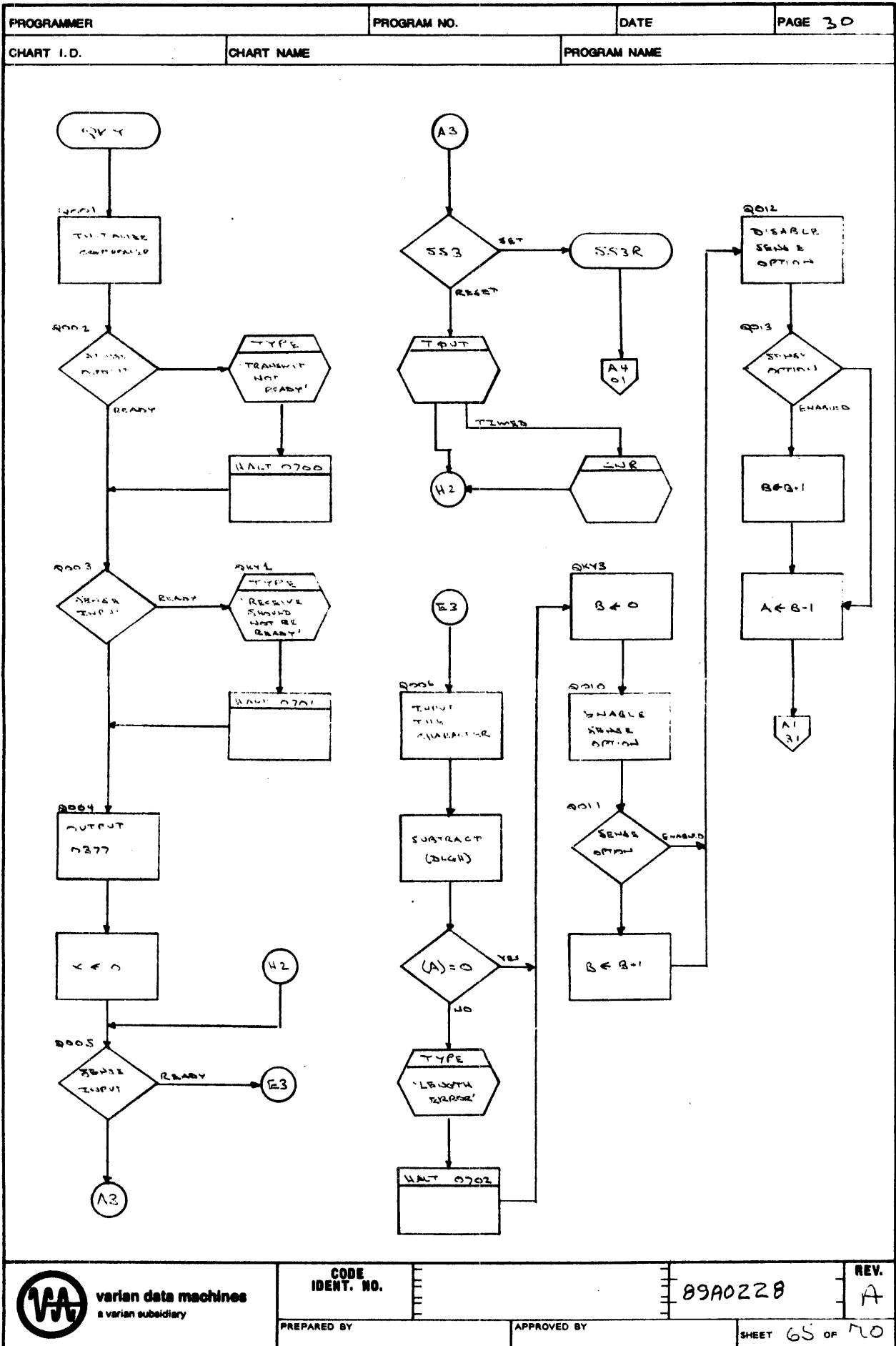
PROGRAMMER	PROGRAM NO.	DATE	PAGE 29
CHART I.D.	CHART NAME	PROGRAM NAME	



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 variens data machines a variens subsidiary	CODE IDENT. NO.	89A0228	REV. A
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IDENT. NO.

89A0228

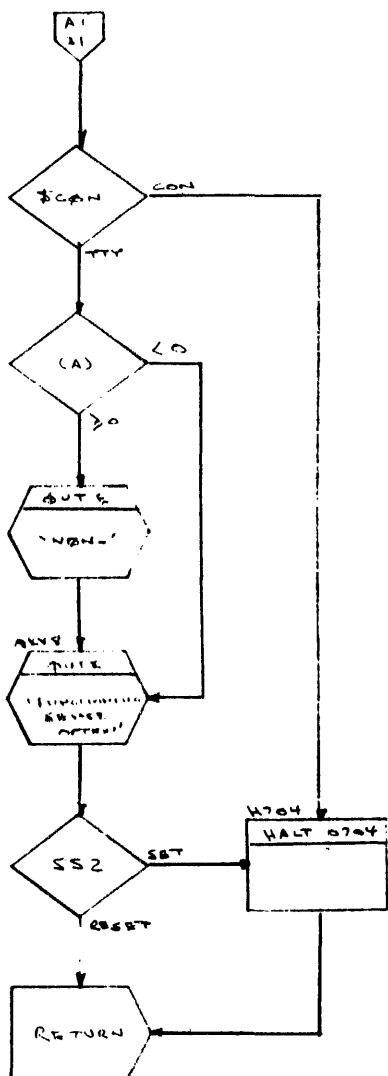
REV.
A

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PROGRAMMER	PROGRAM NO.	DATE	PAGE 31
CHART I.D.	CHART NAME	PROGRAM NAME	



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A

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PROGRAMMER	PROGRAM NO.	DATE	PAGE 32
CHART I.D.	CHART NAME	PROGRAM NAME	

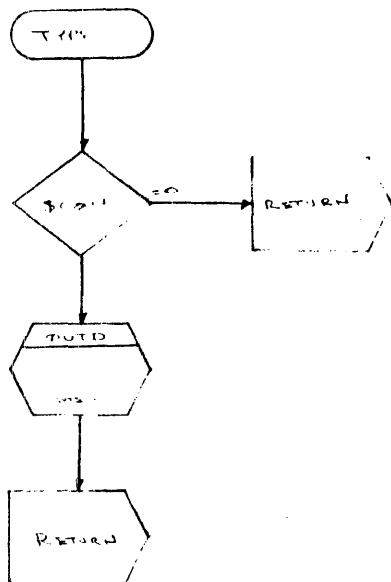
```

graph TD
    Start([SETI]) --> Assign[X ← (A)]
    Assign --> Loop[DO WHILE (X) < 10]
    Loop --> Print[PRINT ADDRESS  
TO (X)+1]
    Print --> End[/RETURN/]

```

 varien data machines a varien subsidiary	CODE IDENT. NO.		REV. A
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PROGRAMMER	PROGRAM NO.	DATE	PAGE 33
CHART I.D.	CHART NAME	PROGRAM NAME	



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 varian data machines a varian subsidiary	CODE IDENT. NO.	89A0228	REV. A
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SECTION 4 TEST SPECIFICATIONS

4.1 OBJECTIVES

The purpose of this section is to describe to what extent the program has been validated in terms of variations in applicable hardware, configurations and other external input parameters. Using the teletype mode of operation, actual hardcopy of each test 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 configuration:

- 1) 620/i - 4K memory

4.3 DETAILED DESCRIPTIONS

The following hard copy printout is provided to validate the responses received for each respective input:

UNIVERSAL ASYNCHRONOUS SERIAL CONTROLLER TEST

☐	UASC DA	2.
	DATA LENGTH	8
	PATTERN	F377.
☐	PIM REQUIRED	N
	MODE	SE
	FUNCTIONING SENSE OPTION	
	000025 PASSES	
	PATTERN	A252.
☐	PIM REQUIRED	Y
	PIM DA	40.
	TA INT LOC	100.
	RX INT LOC	102.
	ER INT LOC	104.
☐	MASA	370.
	MODE	SE
	FUNCTIONING SENSE OPTION	



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CODE
IDENT NO.
21101

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000013 PASSES
PATTERN 10.
PIM REQUIRED Y
MODE BI
BIC DA 20.
BIC DIRECTION T
FUNCTIONING SENSE OPTION

000027 PASSES
PATTERN C
000016 PASSES
PATTERN FO.
PIM REQUIRED N
MODE BI
BIC DIRECTION R
FUNCTIONING SENSE OPTION

000022 PASSES

PATTERN

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varian data machines
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