RECOMP II USERS' PROGRAM NO. 1097

PROGRAM TITLE:

LAOS (Luebbert Alphanumeric Output Subroutine)

PROGRAM CLASSIFICATION: Subroutine

AUTHOR:

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PURPOSE:

To type out any amount of alphanumeric data stored in the computer memory in the 8 character per word format produced by the TYA instruction (+72 776XO), the sail subroutine or the URAL Utility Routine.

DATE:

1 August 1961

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AUTONETICS INDUSTRIAL PRODUCTS A DIVISION OF NORTH AMERICAN AVIATION, INC. 3400 E. 70th Street, Long Beach 5, Calif. PROGRAM TITLE: LAOS (Luebbert Alphanumeric Output Subroutine)

- 1. PURPOSE:
- 1.1 To type out any amount of alphanumeric data stored in the computer memory in the 8 character per word format produced by the TYA instruction (+72 776X0), the sail subroutine or the URAL Utility Routine.

2. **RESTRICTIONS**:

2.1 Each word to be output must be packed in the manner specified below:

lst Char	3rd Char			8th Char
S bl		 	 	b39

Each character must be one five-bit byte in Baudot (teletypewriter) code. Words are typed in sequence from L(S), the starting location, to L(F) the final location as specified in the calling sequence.

- 2.2 Since data prepared by the AN-049 subroutine included in PPP-2 packs only 6 characters per word in a different format this routine cannot be used to output such data. The calling sequence is however identical.
- 3. METHOD: (See flow chart Paragraph 5)
- 4. USAGE:
- 4.1 Calling Sequence:

Q	SLR TRA LAOS	
α+1	PZE L(S) Location of fir PZE L(F) Location of las	st packed word st packed word
α+2	Normal Return	

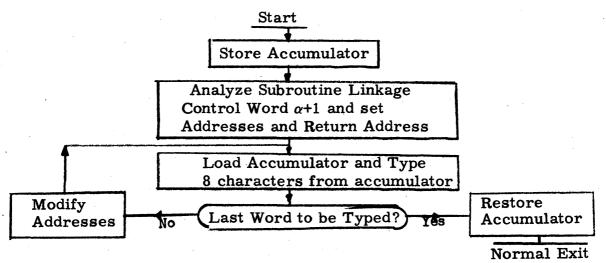
- 4.2 Error Returns: None.
- 4.3 Extent of Storage: 21₈ words.
- 4.4 Unused Locations: None.

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- 4.5 Relocation Information: This routine is not supplied in standard relocatable form because manual relocation is so simple. Merely mask off the location setting on the standard tape (L00000Enter", the very first block of characters on the tape), set the location counter to the location you would like the subroutine entered and then fill. Then increase the addresses of the <u>first 3 instructions</u> only by the starting location of the subroutine (the number you put into the location counter). This relocates the subroutine.
- 4.6 This subroutine restores the accumulator to its original value at the end of the subroutine. It utilizes both the L and V loops and does not restore them.
- 4.7 Restart Provisions: If the typewriter prints garbage at the start of a typeout the person who prepared the input data may not have set the shift condition of the typewriter. Thus, there is a possibility that the typewriter may be in the wrong initial shift condition. If this occurs change the shift position manually by depressing the appropriate shift key and start over.
- 5. CODING INFORMATION:

5.1	Constants:	L00100	1b38
		L00110	1b39
		L00170	lb18

- 5.2 Unused Locations: None. Erasable Locations (previous contents of which will be destroyed by this subroutine L00150.
- 5.3 Flow Chart:



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5.4 Typeout speed is essentially the maximum speed of the typewriter, approximately 100 words per minute.

6. CHECKOUT

6.1 This routine was used to typeout a variety of data from various memory locations prepared by RDA instruction (+71 776X0), the SAIL subroutine and the URAL Utility Routine.

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LOCA		N	-	TION	Final Condn.			RUCTION		
Addre	S S	I	Opn	Operand	Accumulator	S	Op	Address	I	Relocate? NOTES AND REMARKS
000	0	0	SAX	Delta	$0-0\alpha.1$	+	15	0015	0	Yes
1		1	CTL	0002	0- 0α . 1	+	64	0002	0	Yes
	1	0	CTV	0012	$0-0\alpha, 1$	+	66	0012	0	Yes
		1	TRA	7762	$0 - 0\alpha . 1$	+	57	7762	0	No
7762	2	0	ADD	1b39	$0-0(\alpha+2, 0)$	+	01	7761	0	No
4		1	STA	PHI.1	$0-0(\alpha+2,0)$	+	42	7764	1	No
T	3	0	ADD	1b38	$0-0(\alpha+2,0)$	+	01	7760	0	No
		1	STA	Theta .1	$0-0(\alpha+2,0)$	+	42	7774	11	No
(PHI)	4	0	NOP		$0-0(\alpha+2, 0)$	+	40	0000	0	No
		1	CLA	(a+1.0)	+00L(S)+00L(F)+	00	0000	0	No
	5	0	STA	Sigma .0	+00L(S)+00L(F)+	42	7767	0	No
		1	ALS	24	+00L(F)+0-0	+	41	0024	0	No
	6	0	STA	Iota		+	42	7776	0	No
I		1	NOP			+	40	0000	0	No
¥ 000	7	0	CLA	L(s)	Alpha Data	+	00	0000	0	No
767		1	TYC	8 chars		+	72	7760	0	No
002	0 [0	CLA	Sigma		+	00	7767	0	No
7770		1	SUB	Iota		+	03	7776	0	No
1 002	1	0	TZE	Beta		+	50	7774	0	No
		1	TRA			+	57	7772	0	No
001	2	0	CLA		+00 00010-0-0	_	00	7777	0	No
A		1		Sigma	+00(L(s)+1+727	L	1		0	No
	3	0			+00(L(s)+1+727			7767	0	No
		1		Sigma	+00(L(s)+1+727	760	57	7767	0	No
(BETA		0	CLA	Delta	+00(L(s)+1+727	760	00	7775	10	No
(THET	. E	1	TRA	$(\alpha + 2.0)$		+	57	0000	0	No
DELTA	6	0	TEM	P STORAG	E	+	00	0000	0	No Temp Storage for (A)
		1				+	00	0000	0	No at beginning of s.r.
IOTA)	6	0	CON	TROL WOR	D	+	00	0000	0	No Control Word designates
Y		1				+	72	7770	0	No end of data for typeout
Y001 '	7	0	CON	TANT 1b1	8	+	00	0001	0	No 1b18 constant for
777	Ī	1		**************************************		-	00	0000	0	No address modification

Luebbert Date: 1 August 1961 LOCATION ACTION Final Condn. INSTRUCTION I Address Opn Operand Accumulator S Op Address NOTES AND REMARKS I CONSTANT 1b38 001 **0** 00 0000 Used for address modification 0 + 0 Ē 00 0001 7760 1 0 -W. 0011 0 CON\$TANT 1b39 00 0000 Used for address modification 0 + 1 0000 00 7761 1 Prepared by: Maj. 2 0 1 3 0 UNITED STATES MILITARY ACADEMY 1 0 4 DEPARTMENT OF ELECTRICITY 1 WEST POINT, NEW YORK 0 5 1 0 6 1 0 7 SUBROUTINE LINKAGE 1 SLR 0 TRA L(LAOS 0 L(S); Location of Start of Alpha Data 1 PZE L(S) **Output Subroutine (LAOS)** PZE L(F) L(F): Location of Finish of Alpha Data Luebbert Alphanumeric 0 1 Normal Return 1 2 0 1 3 0 1 4 0 1 5 0 1 6 0 1 Subject: 7 0 1

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