

REFERENCE MANUAL

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FORWARD AND REVERSE  
TRANSLATORS

5800 BILLING/ACCOUNTING SYSTEM

**SINGER**  
FRIDEN DIVISION

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REFERENCE MANUAL

FORWARD AND REVERSE  
TRANSLATORS

5800 BILLING/ACCOUNTING SYSTEM

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**SINGER**  
**FRIDEN DIVISION**

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# PREFACE

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This manual provides the programmer with information necessary to program a 5800 Billing/Accounting System using the 5800 Forward and Reverse Translators. It is assumed that the programmer is completely familiar with the material contained in the Reference Manual for the 5800 Billing/Accounting System (Friden Publication No. 10-701).

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# INTRODUCTION

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The 5800 Forward Translator is a software program which enables the generation of machine language program tapes from 17 basic commands and their modifiers. The language used by the Translator is comprised entirely of alphanumeric characters; each character corresponding to the key to be depressed during translation.

The 5800 Reverse Translator is a software program which translates 5800 machine language program tapes into Forward Translator language. The Reverse Translator accepts both program tapes which have been prepared directly in machine language and program tapes which have been prepared using the Forward Translator.

This manual contains descriptions of the 5800 Forward and Reverse Translators, a dictionary of their language, and descriptions of their operations.

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## Note

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The control codes shown in columns 0 and 1 of the ASCII code chart are generated from the 5800 alphanumeric keyboard as follows: Press and hold the CONT key and then type the desired character.

Text designation in this manual for these control characters is by a superscript c. Thus, Control Q (DC1 code) is shown as <sup>c</sup>Q.

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# OBJECT LANGUAGE

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A dictionary of the Translator Object Language Commands used by the 5800 Translators is presented in Table 1. For quick reference, a summary of the Translator Object Language Commands is provided in Table 2. A Table of Variants is contained in Table 3.

# OBJECT LANGUAGE

**TABLE 1: TRANSLATOR OBJECT LANGUAGE COMMANDS**

COMMAND	OBJECT CODE	MODIFIER	DESCRIPTION
ADD	A		RP+RA, RP=RP
SUBTRACT	SU		RP-RA, RP=RP
MULTIPLY	MU		RP×RA, RP=RP
DIVIDE	D		RP÷RA, RP=RP
LABEL	L	S	Indicates a SEQUENCE SEPARATOR and requires a two-character address. The first character must either be an O, for an Open Sequence, or a P, for a Protected Sequence. The second character is the label and may be any code from columns 2-7 of the ASCII code chart with the exception of the Space and Delete codes (see Appendix A).
		R	Indicates a RESUME and requires a two digit address from 00 thru 99.
BRANCH	B	S	Indicates a BRANCH TO SEQUENCE; and requires a variant of 0 thru 9 (see Table of Variants) to indicate the BRANCH condition. The variant must be followed by a two-character address with the first character being either an O or a P and the second character being the LABEL of the required SEQUENCE.
		R	Indicates a BRANCH TO RESUME and requires a variant of 0 thru 7 (see Table of Variants) to indicate the BRANCH condition. The variant must be followed by a two digit address from 00 thru 99. The address 00 is used for ERROR RESUME.
ENTER	E	N	Indicates a numeric entry according to the LRD pattern given by the address. The maximum is 9 left and 7 right, allowing for the sign. Entry is made into RA; the previous contents of RA are transferred to RP, and the previous contents of RP are lost.
		A	Allows the entry of one character into RA. A unique value for each code appears in the lowest four positions of RA. These positions are cleared;

TABLE 1. continued

COMMAND	OBJECT CODE	MODIFIER	DESCRIPTION
ENTER	E	A	however, the remaining contents of RA and RP, including the sign, remain unchanged.
OUTPUT	O	N	Indicates a NON DECIMAL output of the contents of RA according to the LRD pattern of the address. The maximum is 9 left and 6 right. RA and RP remain unchanged.
		D	Indicates a DECIMAL output of the contents of RA according to the LRD pattern of the address. The maximum is 9 left and 6 right. RA and RP remain unchanged.
		A	Transmits a character conforming to the lowest four positions of RA. The contents of RA and RP remain unchanged. This is the reverse of EA.
		S	Causes the sign of RA to be transmitted to all active receivers. RA and RP remain unchanged.
RETURN	R		If a BRANCH TO SEQUENCE with a mark has been executed, this command causes a return to the first mark in the program area. If no mark has been set, this command is treated as NO OPERATION.
CONSTANT	C	O	RA=0, RP=RP
		R	Causes a constant of .005 to be added absolutely to the contents of RA, RP is unchanged.
		V	Causes the value and sign of the address to be placed in RA. Maximum is 14 digits plus decimal point plus sign. (If the maximum of 14 digits is used, the format must be 8.6± or 9.5±.
INVERT	I	R	Causes the contents of RA and RP to be interchanged. RA=RP, RP=RA.
		S	Causes the sign of RA to be changed + to - or - to +.
PROTECT	P		Causes the insignificant spaces in the next output command to be converted to asterisks. This command must be repeated each time the asterisks are required.

# OBJECT LANGUAGE

TABLE 1. continued

COMMAND	OBJECT CODE	MODIFIER	DESCRIPTION
HALT	H		Places the CPU in a halt condition; processing stops. Processing resumes upon receipt of a DC4 code from the active transmitter.
NO OPERATION	N		Reserves program area for program substitution. Normally used in performing a program overlay.
SHIFT	SH	L	Causes the contents of RA to be shifted left the number of positions indicated by the address. Address range is from 01 thru 15.
		R	Causes the contents of RA to be shifted right the number of positions indicated by the address. Address range is from 01 thru 15.
TRANSMIT	T	D (Data) P (Peripheral) A (Auto Reproduce) T (Terminate Auto Reproduce)	Causes all following character or control codes to be transmitted to the interface for execution. Each transmission block is automatically packed. Each address character occupies two positions of memory. (NOTE: The translation of TRANSMIT commands is discussed on Page 14.)
MOVE	MO	DS	Indicates a direct STORE instruction and is followed by a two digit address from 00 thru 89. The contents of RA are transferred to the addressed storage. RA and RP remain unchanged. The previous contents of the storage are lost.
		DR	Indicates a direct RECALL instruction and is followed by a two digit address from 00 thru 89. The contents of the address storage are transferred to RA, the previous contents of RA are transferred to RP, and the previous contents of RP are lost. The contents of the addressed storage remain unchanged.
		DA	Indicates a direct ACCUMULATE instruction and is followed by a two digit address from 00 thru 89. The contents of RA are algebraically added to the contents of the addressed storage. RA and RP remain unchanged.
		IS	Indicates an indirect STORE to the storage indicated by the first two digits left of the decimal in storage 00,

TABLE 1. continued

COMMAND	OBJECT CODE	MODIFIER	DESCRIPTION
MOVE	MO	IS	regardless of sign or of other digits. RA and RP remain unchanged.
		IR	Indicates an indirect RECALL from the storage indicated by the first two digits left of the decimal in storage 00, regardless of the sign or of other digits. The contents of the storage are transferred to RA, the previous contents of RA are transferred to RP, and the previous contents of RP are lost.
		IA	Indicates an indirect ACCUMULATE from the storage indicated by the first two digits left of the decimal in storage 00, regardless of the sign or of the other digits. The contents of RA are algebraically added to the contents of the addressed storage. RA and RP are unchanged.

# OBJECT LANGUAGE

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**TABLE 2: SUMMARY OF TRANSLATOR OBJECT LANGUAGE COMMANDS**

COMMAND	MODIFIER	ADDRESS	5800 INSTRUCTION
ADD			ADD
SUBTRACT			SUBTRACT
MULTIPLY			MULTIPLY
DIVIDE			DIVIDE
LABEL*	S	OX or PX	SEQUENCE
	R	00-99	RESUME
BRANCH*	S	0-9 OX or PX	BRANCH TO SEQUENCE
	R	0-7 00-99	BRANCH TO RESUME
CONSTANT	O		CLEAR RA
	R		ADD FIVE (add .005)
	V	14 digits +D/PT+SIGN	CONSTANT
MOVE	DS	00-89	STORE
	DR	00-89	RECALL
	DA	00-89	ACCUMULATE
	IS		STORE
	IR		RECALL
	IA		ACCUMULATE
ENTER	N	XX (LRD)	ENTER
	A		ALPHA IN
OUTPUT	N	XX (LRD)	NON-DECIMAL PRINT
	D	XX (LRD)	DECIMAL PRINT
	A		ALPHA OUT
	S		PRINT SIGN

\*NOTE: In the commands LABEL and BRANCH when the modifier is "S":

O = Open sequence (can be selected by the operator).

P = Protected sequence (cannot be selected by the operator).

TABLE 2. continued

COMMAND	MODIFIER	ADDRESS	5800 INSTRUCTION
INVERT	R		INVERT
	S		CHANGE SIGN
SHIFT	L	XX	SHIFT LEFT
	R	XX	SHIFT RIGHT
NO-OPERATION			NO-OPERATION
HALT			HALT
PROTECT			CHECK PROTECT
TRANSMIT	D (Data) P (Peripheral) A (Auto Reproduce) T (Terminate Auto Reproduce)		TRANSMIT
RETURN			RETURN



TABLE 3: TABLE OF VARIANTS – BRANCH COMMANDS

VARIANT	TEST	BRANCH TO SEQUENCE	BRANCH TO RESUME
0	RA = 0	MARK	NO MARK
1	MS 1 SET	MARK	NO MARK
2	MS 2 SET	MARK	NO MARK
3	MS 3 SET	MARK	NO MARK
4	MS 4 SET	MARK	NO MARK
5	RA < 0	MARK	NO MARK
6	RA ≥ 0	MARK	NO MARK
7	UNCONDITIONAL	MARK	NO MARK
8	NO TEST	NO COMMAND	NO COMMAND
9	UNCONDITIONAL	ERASE ALL MARKS	NO COMMAND

# FORWARD TRANSLATOR

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## GENERAL

Programming with the 5800 Forward Translator differs from machine language programming in the following ways:

- Sequence address prefixing is automatic; therefore, the risk of address duplication is removed. The translator provides 94 open and 94 protected sequences.
- Hexadecimal addresses are produced from two digit numeric entries.
- Command separators and carriage return codes are automatically punched in the program tape. Carriage Return codes are automatically inserted between every 65 to 70 codes.
- A count of the positions of program area used is presented by sequence and in total.
- The printer is halted after every 54 lines (9 inches) for the insertion of a new page.
- The control codes required to place the unit in a *load* mode are automatically inserted at the start of the program tape.
- Error sequence and error resume addresses are automatically inserted in the program tape.
- The codes required to terminate a Load mode are automatically punched at the end of the program.
- If the *tab memory load* is not performed by a program sequence, an optional simple method for loading the tab memory is provided.
- Accidental selection of the start sequence is inhibited after translation has started. The inhibition is removed after the end of translation.
- The program is fully documented, thus making debugging easier. By pressing the MANUAL SELECTOR switch 1, additional narrative can be entered with the LABEL SEQUENCE, ENTER, OUTPUT, and HALT commands.
- The addresses of TRANSMIT commands are entered without the necessity of checking for a maximum of eight characters. Control and format codes are automatically converted to provide the prefix and following codes required by the hardware. All codes inserted in the address portion of TRANSMIT commands are printed; normally non-printing codes are printed in mnemonics.
- A protected, non-translatable sequence address is automatically inserted at

# FORWARD TRANSLATOR

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the end of each program to prevent execution from continuing into a previously loaded program.

MANUAL SELECTOR switch 4 may be used to insert sequence labels automatically for the SPACE, NEW LINE, TAB, and BACKSPACE keys. This allows the keys to be used for form alignment during program operation.

## PREPARATION AND OPERATION

### Preparation for Translation

Before starting to write a program, form design and program flow should be completed. It is recommended that the program logic be tested on a Friden Calculator which provides an INVERT key, thus closely simulating the operations of RA and RP.

With correct forms design, system flow diagrams, and proven logic, writing a program will be simplified and less time will be required for debugging.

### Operating Instructions for the Forward Translator

The Forward Translator is operated in the following manner:

1. Load the Translator program tape into the tape reader. Type  $\text{CQ}$  and depress the V key to start the reader.
2. Insert continuous blank stock tab paper or a blank single sheet into the printer.
3. Press the punch FEED button to supply leading blank tape.
4. If desired, press the appropriate Manual Selector Switches.

Switch	Operation
1	Causes a halt for entry of a narrative description for each LABEL, SEQUENCE, ENTER, OUTPUT, and HALT instruction.
3	Causes blank sequence labels to be inserted for SPACE, BACKSPACE, NEW LINE, and TAB instructions; therefore allowing free use of these keys during program operation.
4	Allows entry of the tab memory program at the end of the object tape. This switch should be set if the tab memory is not loaded by a program sequence.

5. Press the 1 key.

6. Type the name of the program and press the END key. The printer types the following:

```
LABEL  S  00
LABEL  R  00
```

The codes required to place the 5800 CPU in a load mode and the object codes for the labels are automatically punched.

7. Complete the ERROR sequence by entering the appropriate translator codes.
8. Terminate the ERROR sequence by pressing the asterisk (\*) and SHIFT keys simultaneously. (This sequence may not be the operational error sequence, but it is required in case the operator attempts to select an invalid sequence.) The number of program positions used by the ERROR sequence is printed.
9. Continue to translate each sequence, using the asterisk key each time a sequence is terminated.
10. When long sequences are translated, the unit will automatically halt every 54 lines for the insertion of another sheet of paper.
11. After all sequences have been translated, press the F key to punch the codes required to terminate the load mode.
12. If MANUAL SELECTOR switch 4 is not set, the total number of program positions required is printed and the CPU is placed in a HALT condition with only the Alphanumeric keyboard active. Any required codes may be entered at this point; however, the printer and the punch must be activated.
13. If MANUAL SELECTOR switch 4 is set, the total number of program positions required is printed. Three inches of blank tape are generated and the control codes necessary to start the tab memory load are punched. The printer types L/H MARGIN.
14. Enter the three digit position of the left-hand margin.
15. Press the T key; the printer types TAB. Enter the three digit tab position.
16. Repeat step 15 for each tab position desired.
17. Press the R key and enter the three digit position of the right-hand margin.
18. The CPU is now in a HALT condition with the printer and punch inactive. Any required codes may be entered at this point; however, the printer and punch must be activated.

## Operating Instructions for Translating TRANSMIT Commands

For translating TRANSMIT commands, use the following procedure:

1. Enter T; the printer types TRANSMIT.
2. Enter one of the following:
  - D — To allow entry of Data or Object codes (see step 2a).
  - A — To enter the Auto Reproduce sequence (see step 2b).
  - T — To terminate the Auto Reproduce sequence (see step 2c).
  - P — To allow entry of Peripheral Control codes (see step 2d).
- 2a. If D is entered, enter the number of codes to be transmitted (over an LRD pattern of 30) and then enter the necessary symbols or control codes. The translator automatically counts and splits the codes into blocks of eight and terminates the command after the stated number of codes is entered.
- 2b. If A is entered, the printer types ARP and halts to allow entry of the number of codes to be included in the same instruction. Enter this number and then enter a space code.

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### Note

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Functional Peripheral Control codes cannot be entered. A DC3 code cannot be included in the instruction. All other control codes are entered as shown in Table 4.

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- 2c. If T is entered, the printer types TRP and punches the necessary codes for a DC3. The TRANSMIT command is then terminated.

TABLE 4: LIST OF NORMALLY NON-PRINTING FORMAT AND CONTROL CODES AND THEIR PRINTOUTS

KEY DEPRESSED	PRINTED IN RED AS
BACKSPACE	BS
HORIZONTAL TAB	HT
VERTICAL TAB ( <sup>c</sup> K)	VT
LINE FEED ( <sup>c</sup> J)	LF
FORM FEED ( <sup>c</sup> L)	FF
NEW LINE	LN
FIELD SEPARATOR ( <sup>c</sup> \)	FS
GROUP SEPARATOR ( <sup>c</sup> ])	GS
UNIT SEPARATOR ( <sup>c</sup> _)	US
SPACE	SP
	PRINTED IN BLACK AS
DEVICE CONTROL 1 ( <sup>c</sup> Q)	DC1
DEVICE CONTROL 2 ( <sup>c</sup> R)	DC2
DEVICE CONTROL 4 ( <sup>c</sup> T)	DC 4

**Note**

DEVICE CONTROL 3 (DC3) is not included since it can only be translated under the modifier T or entered in object code (!3) in a TRANSMIT DATA instruction.

2d. If P is entered, the printer automatically types the character DC. Enter 1 or 2 to enter one or two general commands. The printer advances one space. Enter one of the following:

T — For a Transmitter control (see [1])

## FORWARD TRANSLATOR

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- R — For a Receiver control (see [1])
- E — For a peripheral edit function other than ON or OFF (see [2])
- A — To inactivate all transmitters or receivers (see [3])

- [1] If T or R is entered, enter one of the following:
- A — For ON (Active)
  - I — For OFF (Inactive)

If DC1 was entered, the TRANSMIT command is terminated.

- [2] If E is entered, enter the number of EDIT instructions required (over an LRD pattern of 20). The printer automatically types a slash (/) and asks for entry of the interface address of the required peripheral unit (over an LRD pattern of 20).
- [3] If A is entered, enter either R (for Receivers) or T (for Transmitters). The printer automatically types I as a suffix (for example, ARI for All Receivers Inactive).

If DC 2 was entered, the printer asks for entry of the second general command. Enter the command.

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### Note

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Due to the rules of the Standard Interface, if the first command was either a T or an R, the second command cannot be an E.

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If T or R is entered in both commands, the TRANSMIT Command is terminated.

If the first modifier entered was an E, the translator asks for the entry of the number of instructions indicated by the address portion of E. Enter the instructions. All format and control codes (except DC codes) require the depression of one key (see Table 4). The translator automatically converts these non-printing codes into two-character mnemonics. All necessary DC codes are automatically inserted by the translator; additionally, the translator automatically splits the address of the TRANSMIT command into blocks of eight. When the required number of commands have been entered, the TRANSMIT command is automatically terminated.

Apart from the codes in Columns 0 and 1 of the ASCII code chart and the SPACE code, the only code that cannot be punched directly is the NUL code. The procedure for generating a NUL code is shown in Table 5.

TABLE 5: METHOD FOR OUTPUT OF NUL CODES (BLANK TAPE)

CONSTANT	MODIFIER	ADDRESS	OUTPUT
LABEL	S		PN output 30 NUL codes
CONSTANT	V	1+	
CONSTANT	V	30-	
LABEL	R		99
OUTPUT	A		
ADD			
BRANCH	R		99
RETURN			

Number of positions of program area = 20

**Note**

A NUL code cannot be transmitted directly since the column shift requirements call for ! (SP). The SPACE code functions as an instruction separator and is not loaded in program area.

The translator will not allow control and data codes to be mixed in the same Transmit commands.

The Reverse Translator will provide the same printout as the Forward Translator.

When a format code is transmitted under a DATA instruction, the format code will function and reproduce if the printer and the punch are active. When a format code is transmitted under an EDIT instruction, the code will function regardless of the condition of the punch (see Table 6).



TABLE 6: FORMAT CODE UNDER DATA AND EDIT INSTRUCTIONS

<b>Requirements</b>			
1. Edit Printer			
2. Printer Active			
3. Horizontal Tab			
<b>Written As:</b>	<b>Command</b>	<b>Modifier</b>	<b>Address</b>
	T	P	2 E1/3 RA/3 HT
<b>Translator Printout</b>			
Transmit		P	DC2 E1/3 RA/3 HT
<b>Object Codes Punched</b>			
/!23C!)(SP)			
<b>Requirements</b>			
1. Edit Printer			
2. 8 Line Feeds			
3. 1 Horizontal Tab			
4. 2 Spaces			
<b>Written As:</b>	<b>Command</b>	<b>Modifier</b>	<b>Address</b>
	T	P	1 E11/3 8xLF 1HT 2xSP
<b>Translated As</b>			
Transmit		P	DC1 E11/3 DC2 LF LF LF LF LF LF LF LF HT SP SP DC1
<b>Object Codes Punched</b>			
/!13!2;*!*!*!*!* (SP)			
/!*!*!*!)!@!@!1 (SP)			

TABLE 6. continued

<b>Requirements</b>			
1. Edit Int. Punch			
2. Edit Aux Punch			
3. Card Feed			
<b>Written As:</b>	<b>Command</b>	<b>Modifier</b>	<b>Address</b>
	T	T	2E1/7 E1/9 F
<b>Translated As</b>			
Transmit		P	DC2 E1/7 E1/9 F
<b>Object Codes Punched</b>			
/!279F			
<b>Requirements</b>			
DATA — 1. TAB			
2. TOTAL			
3. TAB			
<b>Written As:</b>	<b>Command</b>	<b>Modifier</b>	<b>Address</b>
	T	T	7 HT TOTAL HT
<b>Translated As</b>			
Transmit		D	7 HT TOTAL HT
<b>Object Codes Punched</b>			
/!)TOTAL!)(SP)			
NOTE: In this case the TAB codes and DATA will be punched if a punch is active.			

# FORWARD TRANSLATOR

The following figures show the programming of the same Billing/Accounts Receivable sequence using machine language (Figure 1) and using a 5800 Forward Translator (Figure 2).

**Figure 1. Programming using Machine Language.**

XLB	K11+
K1+	R5
V25	S
A	J007
C25	I
K47+	/!25EI
S	N
J602	/!2ell
B	J706
Y02	Y07
/!15N	/!2QE
K4+	V23
C25	N90
/!1\$02	/!75!2LLLL
Y06	/!1!2ell
O	B
L	

NOTE: Program codes equal the number of keys pressed (total depressions equal 144).

**Figure 2. Programming using the 5800 Forward Translator.**

COMMAND	MODIFIER	ADDRESS	COMMAND	MODIFIER	ADDRESS
L	S	PB	C	V	11+
C	V	1+	SH	R	05
MO	DR	25	SU		
A			B	R	0 07
MO	DS	25	I	R	
C	V	47+	T	P	DC2 E1/5 RA/5 I
SU			O	A	
B	R	6 02	T	P	DC 2 RI/5 TA/5
R			B	R	7 06
L	R	02	L	R	07
T	P	DC1 E1/5 N	T	P	DC2 RA/1 TA/5
C	V	4+	MO	DR	23
MO	DS	25	O	N	90
T	P	DC1 E2/5 02	T	P	DC1 E5/5 TLLLL
L	R	06	T	P	DC2 RI/5 TA/5
C	O		T	P	1 E5/5 TLLLL
E	A		T	P	2 RI/5 TA/5

NOTE: Program codes equal the number of keys depressed (total depressions equal 141).

# REVERSE TRANSLATOR

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## GENERAL

The 5800 Reverse Translator is a software program which translates 5800 machine language program tapes into Forward Translator language. The Reverse Translator accepts both program tapes which have been prepared directly in machine language and program tapes which have been prepared using the Forward Translator.

## OPERATION

The Reverse Translator operates automatically. As a program tape is read into the system the translation is typed by the printer on continuous tab paper (13-1/2 inch minimum width). The translator inserts column headings and page numbers as it moves from tab sheet to tab sheet.

The MANUAL SELECTOR switches can be used to provide the following operations during reverse translation:

MANUAL SELECTOR Switch	Operation
1	Halts translation after LABEL SEQUENCE, ENTER, OUTPUT, and HALT instructions for entry on narrative descriptions.
2	Allows reverse translation of a program tape which does not conform to the rules of the Forward Translator (for example, data and peripheral codes contained in the same TRANSMIT instruction). In this case the ACTIVE, INACTIVE, and EDIT instructions are typed in machine language. Non-printing instructions are typed as shown in Table 7.
3	This switch can be set at any time during translation and causes translation to halt at the start of the next sheet of tab paper. The halt may be used to perform necessary form adjustment or alignment.
4	Provides for translation of a tab memory program which is separately punched and is not generated as a program sequence.

# REVERSE TRANSLATOR

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**TABLE 7: LIST OF NORMALLY NON-PRINTING FORMAT AND CONTROL CODES AND THEIR PRINTOUTS**

CODE DESCRIPTION	PRINTED IN RED AS
BACKSPACE	BS
HORIZONTAL TAB	HT
VERTICAL TAB	VT
LINE FEED	LF
FORM FEED	FF
NEW LINE	NL
FIELD SEPARATOR	FS
GROUP SEPARATOR	GS
UNIT SEPARATOR	US
SPACE	SP
	<b>PRINTED IN BLACK AS</b>
DEVICE CONTROL 1	DC1
DEVICE CONTROL 2	DC2
DEVICE CONTROL 4	DC4
* DC1 FOLLOWED BY ?;	ARP
* THE NEXT DC3	TRP

\* If MS2 is set:

DCL ?	DC1 ?
DC3	DC3

# ASCII CODE CHART

BITS					Column	0	0	0	0	1	1	1	1
					Row	0	1	2	3	4	5	6	7
b4	b3	b2	b1										
0	0	0	0	0	NUL	DLE	SP	0	@	P	,	p	
0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q	
0	0	1	0	2	STX	DC2	"	2	B	R	b	r	
0	0	1	1	3	ETX	DC3	#	3	C	S	c	s	
0	1	0	0	4	EOT	DC4	\$	4	D	T	d	t	
0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u	
0	1	1	0	6	ACK	SYN	&	6	F	V	f	v	
0	1	1	1	7	BEL	ETB	'	7	G	W	g	w	
1	0	0	0	8	BS	CAN	(	8	H	X	h	x	
1	0	0	1	9	HT	EM	)	9	I	Y	i	y	
1	0	1	0	10	LF	SUB	*	:	J	Z	j	z	
1	0	1	1	11	VT	ESC	+	;	K	[	k	{	
1	1	0	0	12	FF	FS	,	<	L	\	l		
1	1	0	1	13	CR	GS	-	=	M	]	m	}	
1	1	1	0	14	SO	RS	.	>	N	^	n	~	
1	1	1	1	15	SI	US	/	?	O	_	o	DEL	

Memorandum

**SINGER**  
FRIDEN DIVISION

to: All Regional and Branch Offices  
from: D. J. Hayden  
subject: Addition to Forward and Reverse Translators  
Reference Manual, Publication Number 10-719

SAN LEANDRO, CALIFORNIA

refer to:

date: 9/22/71

Attached is a copy of ADDENDUM A, Operating Instructions for the Reverse Translator. This operating procedure was not available when the subject manual was originally printed.

Insert this page, A1, immediately after page 23 of 10-719. If additional copies are required, they may be obtained from San Leandro on Literature Order Form 80-100. Specify- "Publication #10-719, Addendum A".



D. J. Hayden, Manager  
Technical Publications

DJH:adm

Attachment

## REVERSE TRANSLATOR

### Operating Instructions for the Reverse Translator

The Reverse Translator is operated in the following manner:

1. Insert the Reverse Translator program tape into the tape reader. Type  $\text{CQ}$  and  $\text{V}$  to start the reader.
2. Insert stock tab paper into the printer. Adjust the paper so that printing will begin on the second line of the page.
3. Insert the tape of the program to be translated into the tape reader.
4. If desired, press the appropriate MANUAL SELECTOR switches.
5. Press the 1 key.
6. Type the name of the program to be translated.
7. Press the END key. Reverse translation begins and continues automatically until an END OF PROGRAM code is read.



# 5800 FORWARD AND REVERSE TRANSLATORS REFERENCE MANUAL

## Publication No. 10-719

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- What is your relationship to the product described?

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