Line **Source statement**

```
 5     COPY      START   1000          COPY FILE FROM INPUT TO OUTPUT
10     FIRST     STL     RETADR        SAVE RETURN ADDRESS
15     CLOOP     JSUB    RDREC         READ INPUT RECORD
20               LDA     LENGTH        TEST FOR EOF (LENGTH = 0)
25               COMP    ZERO
30               JEQ     ENDFIL        EXIT IF EOF FOUND
35               JSUB    WRREC         WRITE OUTPUT RECORD
40               J       CLOOP         LOOP
45     ENDFIL    LDA     EOF           INSERT END OF FILE MARKER
50               STA     BUFFER
55               LDA     THREE         SET LENGTH = 3
60               STA     LENGTH
65               JSUB    WRREC         WRITE EOF
70               LDL     RETADR        GET RETURN ADDRESS
75               RSUB                  RETURN TO CALLER
80     EOF       BYTE    C'EOF'
85     THREE     WORD    3
90     ZERO      WORD    0
95     RETADR    RESW    1
100    LENGTH    RESW    1             LENGTH OF RECORD
105    BUFFER    RESB    4096          4096-BYTE BUFFER AREA
110    .
115    .         SUBROUTINE TO READ RECORD INTO BUFFER
120    .
125    RDREC     LDX     ZERO          CLEAR LOOP COUNTER
130              LDA     ZERO          CLEAR A TO ZERO
135    RLOOP     TD      INPUT         TEST INPUT DEVICE
140              JEQ     RLOOP         LOOP UNTIL READY
145              RD      INPUT         READ CHARACTER INTO REGISTER A
150              COMP    ZERO          TEST FOR END OF RECORD (X'00')
155              JEQ     EXIT          EXIT LOOP IF EOR
160              STCH    BUFFER,X      STORE CHARACTER IN BUFFER
165              TIX     MAXLEN        LOOP UNLESS MAX LENGTH
170              JLT     RLOOP           HAS BEEN REACHED
175    EXIT      STX     LENGTH        SAVE RECORD LENGTH
180              RSUB                  RETURN TO CALLER
185    INPUT     BYTE    X'F1'         CODE FOR INPUT DEVICE
190    MAXLEN    WORD    4096
195    .
200    .         SUBROUTINE TO WRITE RECORD FROM BUFFER
205    .
210    WRREC     LDX     ZERO          CLEAR LOOP COUNTER
215    WLOOP     TD      OUTPUT        TEST OUTPUT DEVICE
220              JEQ     WLOOP         LOOP UNTIL READY
225              LDCH    BUFFER,X      GET CHARACTER FROM BUFFER
230              WD      OUTPUT        WRITE CHARACTER
235              TIX     LENGTH        LOOP UNTIL ALL CHARACTERS
240              JLT     WLOOP           HAVE BEEN WRITTEN
245              RSUB                  RETURN TO CALLER
250    OUTPUT    BYTE    X'05'         CODE FOR OUTPUT DEVICE
255              END     FIRST
```

Figure 2.1 Example of a SIC assembler language program.

Line	Loc	Source statement			Object code
5	1000	COPY	START	1000	
10	1000	FIRST	STL	RETADR	141033
15	1003	CLOOP	JSUB	RDREC	482039
20	1006		LDA	LENGTH	001036
25	1009		COMP	ZERO	281030
30	100C		JEQ	ENDFIL	301015
35	100F		JSUB	WRREC	482061
40	1012		J	CLOOP	3C1003
45	1015	ENDFIL	LDA	EOF	00102A
50	1018		STA	BUFFER	0C1039
55	101B		LDA	THREE	00102D
60	101E		STA	LENGTH	0C1036
65	1021		JSUB	WRREC	482061
70	1024		LDL	RETADR	081033
75	1027		RSUB		4C0000
80	102A	EOF	BYTE	C'EOF'	454F46
85	102D	THREE	WORD	3	000003
90	1030	ZERO	WORD	0	000000
95	1033	RETADR	RESW	1	
100	1036	LENGTH	RESW	1	
105	1039	BUFFER	RESB	4096	
110		.			
115		.	SUBROUTINE TO READ RECORD INTO BUFFER		
120		.			
125	2039	RDREC	LDX	ZERO	041030
130	203C		LDA	ZERO	001030
135	203F	RLOOP	TD	INPUT	E0205D
140	2042		JEQ	RLOOP	30203F
145	2045		RD	INPUT	D8205D
150	2048		COMP	ZERO	281030
155	204B		JEQ	EXIT	302057
160	204E		STCH	BUFFER,X	549039
165	2051		TIX	MAXLEN	2C205E
170	2054		JLT	RLOOP	38203F
175	2057	EXIT	STX	LENGTH	101036
180	205A		RSUB		4C0000
185	205D	INPUT	BYTE	X'F1'	F1
190	205E	MAXLEN	WORD	4096	001000
195		.			
200		.	SUBROUTINE TO WRITE RECORD FROM BUFFER		
205		.			
210	2061	WRREC	LDX	ZERO	041030
215	2064	WLOOP	TD	OUTPUT	E02079
220	2067		JEQ	WLOOP	302064
225	206A		LDCH	BUFFER,X	509039
230	206D		WD	OUTPUT	DC2079
235	2070		TIX	LENGTH	2C1036
240	2073		JLT	WLOOP	382064
245	2076		RSUB		4C0000
250	2079	OUTPUT	BYTE	X'05'	05
255			END	FIRST	

Figure 2.2 Program from Fig. 2.1 with object code.

Line **Source statement**

```
  5     COPY      START   0               COPY FILE FROM INPUT TO OUTPUT
 10     FIRST     STL     RETADR          SAVE RETURN ADDRESS
 12               LDB     #LENGTH         ESTABLISH BASE REGISTER
 13               BASE    LENGTH
 15     CLOOP     +JSUB   RDREC           READ INPUT RECORD
 20               LDA     LENGTH          TEST FOR EOF (LENGTH = 0)
 25               COMP    #0
 30               JEQ     ENDFIL          EXIT IF EOF FOUND
 35               +JSUB   WRREC           WRITE OUTPUT RECORD
 40               J       CLOOP           LOOP
 45     ENDFIL    LDA     EOF             INSERT END OF FILE MARKER
 50               STA     BUFFER
 55               LDA     #3              SET LENGTH = 3
 60               STA     LENGTH
 65               +JSUB   WRREC           WRITE EOF
 70               J       @RETADR         RETURN TO CALLER
 80     EOF       BYTE    C'EOF'
 95     RETADR    RESW    1
100     LENGTH    RESW    1               LENGTH OF RECORD
105     BUFFER    RESB    4096            4096-BYTE BUFFER AREA
110     .
115     .         SUBROUTINE TO READ RECORD INTO BUFFER
120     .
125     RDREC     CLEAR   X               CLEAR LOOP COUNTER
130               CLEAR   A               CLEAR A TO ZERO
132               CLEAR   S               CLEAR S TO ZERO
133               +LDT    #4096
135     RLOOP     TD      INPUT           TEST INPUT DEVICE
140               JEQ     RLOOP           LOOP UNTIL READY
145               RD      INPUT           READ CHARACTER INTO REGISTER A
150               COMPR   A,S             TEST FOR END OF RECORD (X'00')
155               JEQ     EXIT            EXIT LOOP IF EOR
160               STCH    BUFFER,X        STORE CHARACTER IN BUFFER
165               TIXR    T               LOOP UNLESS MAX LENGTH
170               JLT     RLOOP             HAS BEEN REACHED
175     EXIT      STX     LENGTH          SAVE RECORD LENGTH
180               RSUB                    RETURN TO CALLER
185     INPUT     BYTE    X'F1'           CODE FOR INPUT DEVICE
195     .
200     .         SUBROUTINE TO WRITE RECORD FROM BUFFER
205     .
210     WRREC     CLEAR   X               CLEAR LOOP COUNTER
212               LDT     LENGTH
215     WLOOP     TD      OUTPUT          TEST OUTPUT DEVICE
220               JEQ     WLOOP           LOOP UNTIL READY
225               LDCH    BUFFER,X        GET CHARACTER FROM BUFFER
230               WD      OUTPUT          WRITE CHARACTER
235               TIXR    T               LOOP UNTIL ALL CHARACTERS
240               JLT     WLOOP             HAVE BEEN WRITTEN
245               RSUB                    RETURN TO CALLER
250     OUTPUT    BYTE    X'05'           CODE FOR OUTPUT DEVICE
255               END     FIRST
```

Figure 2.5 Example of a SIC/XE program.

Line	Loc	Source statement			Object code
5	0000	COPY	START	0	
10	0000	FIRST	STL	RETADR	17202D
12	0003		LDB	#LENGTH	69202D
13			BASE	LENGTH	
15	0006	CLOOP	+JSUB	RDREC	4B101036
20	000A		LDA	LENGTH	032026
25	000D		COMP	#0	290000
30	0010		JEQ	ENDFIL	332007
35	0013		+JSUB	WRREC	4B10105D
40	0017		J	CLOOP	3F2FEC
45	001A	ENDFIL	LDA	EOF	032010
50	001D		STA	BUFFER	0F2016
55	0020		LDA	#3	010003
60	0023		STA	LENGTH	0F200D
65	0026		+JSUB	WRREC	4B10105D
70	002A		J	@RETADR	3E2003
80	002D	EOF	BYTE	C'EOF'	454F46
95	0030	RETADR	RESW	1	
100	0033	LENGTH	RESW	1	
105	0036	BUFFER	RESB	4096	
110		.			
115		.	SUBROUTINE TO READ RECORD INTO BUFFER		
120		.			
125	1036	RDREC	CLEAR	X	B410
130	1038		CLEAR	A	B400
132	103A		CLEAR	S	B440
133	103C		+LDT	#4096	75101000
135	1040	RLOOP	TD	INPUT	E32019
140	1043		JEQ	RLOOP	332FFA
145	1046		RD	INPUT	DB2013
150	1049		COMPR	A,S	A004
155	104B		JEQ	EXIT	332008
160	104E		STCH	BUFFER,X	57C003
165	1051		TIXR	T	B850
170	1053		JLT	RLOOP	3B2FEA
175	1056	EXIT	STX	LENGTH	134000
180	1059		RSUB		4F0000
185	105C	INPUT	BYTE	X'F1'	F1
195		.			
200		.	SUBROUTINE TO WRITE RECORD FROM BUFFER		
205		.			
210	105D	WRREC	CLEAR	X	B410
212	105F		LDT	LENGTH	774000
215	1062	WLOOP	TD	OUTPUT	E32011
220	1065		JEQ	WLOOP	332FFA
225	1068		LDCH	BUFFER,X	53C003
230	106B		WD	OUTPUT	DF2008
235	106E		TIXR	T	B850
240	1070		JLT	WLOOP	3B2FEF
245	1073		RSUB		4F0000
250	1076	OUTPUT	BYTE	X'05'	05
255			END	FIRST	

Figure 2.6 Program from Fig. 2.5 with object code.

Line	Source statement			
5	COPY	START	0	COPY FILE FROM INPUT TO OUTPUT
10	FIRST	STL	RETADR	SAVE RETURN ADDRESS
15	CLOOP	JSUB	RDREC	READ INPUT RECORD
20		LDA	LENGTH	TEST FOR EOF (LENGTH = 0)
25		COMP	#0	
30		JEQ	ENDFIL	EXIT IF EOF FOUND
35		JSUB	WRREC	WRITE OUTPUT RECORD
40		J	CLOOP	LOOP
45	ENDFIL	LDA	=C'EOF'	INSERT END OF FILE MARKER
50		STA	BUFFER	
55		LDA	#3	SET LENGTH = 3
60		STA	LENGTH	
65		JSUB	WRREC	WRITE EOF
70		J	@RETADR	RETURN TO CALLER
92		USE	CDATA	
95	RETADR	RESW	1	
100	LENGTH	RESW	1	LENGTH OF RECORD
103		USE	CBLKS	
105	BUFFER	RESB	4096	4096-BYTE BUFFER AREA
106	BUFEND	EQU	*	FIRST LOCATION AFTER BUFFER
107	MAXLEN	EQU	BUFEND-BUFFER	MAXIMUM RECORD LENGTH
110	.			
115	.	SUBROUTINE TO READ RECORD INTO BUFFER		
120	.			
123		USE		
125	RDREC	CLEAR	X	CLEAR LOOP COUNTER
130		CLEAR	A	CLEAR A TO ZERO
132		CLEAR	S	CLEAR S TO ZERO
133		+LDT	#MAXLEN	
135	RLOOP	TD	INPUT	TEST INPUT DEVICE
140		JEQ	RLOOP	LOOP UNTIL READY
145		RD	INPUT	READ CHARACTER INTO REGISTER A
150		COMPR	A,S	TEST FOR END OF RECORD (X'00')
155		JEQ	EXIT	EXIT LOOP IF EOR
160		STCH	BUFFER,X	STORE CHARACTER IN BUFFER
165		TIXR	T	LOOP UNLESS MAX LENGTH
170		JLT	RLOOP	HAS BEEN REACHED
175	EXIT	STX	LENGTH	SAVE RECORD LENGTH
180		RSUB		RETURN TO CALLER
183		USE	CDATA	
185	INPUT	BYTE	X'F1'	CODE FOR INPUT DEVICE
195	.			
200	.	SUBROUTINE TO WRITE RECORD FROM BUFFER		
205	.			
208		USE		
210	WRREC	CLEAR	X	CLEAR LOOP COUNTER
212		LDT	LENGTH	
215	WLOOP	TD	=X'05'	TEST OUTPUT DEVICE
220		JEQ	WLOOP	LOOP UNTIL READY
225		LDCH	BUFFER,X	GET CHARACTER FROM BUFFER
230		WD	=X'05'	WRITE CHARACTER
235		TIXR	T	LOOP UNTIL ALL CHARACTERS
240		JLT	WLOOP	HAVE BEEN WRITTEN
245		RSUB		RETURN TO CALLER
252		USE	CDATA	
253		LTORG		
255		END	FIRST	

Figure 2.11 Example of a program with multiple program blocks.

Line	Loc/Block		Source statement			Object code
5	0000	0	COPY	START	0	
10	0000	0	FIRST	STL	RETADR	172063
15	0003	0	CLOOP	JSUB	RDREC	4B2021
20	0006	0		LDA	LENGTH	032060
25	0009	0		COMP	#0	290000
30	000C	0		JEQ	ENDFIL	332006
35	000F	0		JSUB	WRREC	4B203B
40	0012	0		J	CLOOP	3F2FEE
45	0015	0	ENDFIL	LDA	=C'EOF'	032055
50	0018	0		STA	BUFFER	0F2056
55	001B	0		LDA	#3	010003
60	001E	0		STA	LENGTH	0F2048
65	0021	0		JSUB	WRREC	4B2029
70	0024	0		J	@RETADR	3E203F
92	0000	1		USE	CDATA	
95	0000	1	RETADR	RESW	1	
100	0003	1	LENGTH	RESW	1	
103	0000	2		USE	CBLKS	
105	0000	2	BUFFER	RESB	4096	
106	1000	2	BUFEND	EQU	*	
107	1000		MAXLEN	EQU	BUFEND-BUFFER	
110			.			
115			.	SUBROUTINE TO READ RECORD INTO BUFFER		
120			.			
123	0027	0		USE		
125	0027	0	RDREC	CLEAR	X	B410
130	0029	0		CLEAR	A	B400
132	002B	0		CLEAR	S	B440
133	002D	0		+LDT	#MAXLEN	75101000
135	0031	0	RLOOP	TD	INPUT	E32038
140	0034	0		JEQ	RLOOP	332FFA
145	0037	0		RD	INPUT	DB2032
150	003A	0		COMPR	A,S	A004
155	003C	0		JEQ	EXIT	332008
160	003F	0		STCH	BUFFER,X	57A02F
165	0042	0		TIXR	T	B850
170	0044	0		JLT	RLOOP	3B2FEA
175	0047	0	EXIT	STX	LENGTH	13201F
180	004A	0		RSUB		4F0000
183	0006	1		USE	CDATA	
185	0006	1	INPUT	BYTE	X'F1'	F1
195			.			
200			.	SUBROUTINE TO WRITE RECORD FROM BUFFER		
205			.			
208	004D	0		USE		
210	004D	0	WRREC	CLEAR	X	B410
212	004F	0		LDT	LENGTH	772017
215	0052	0	WLOOP	TD	=X'05'	E3201B
220	0055	0		JEQ	WLOOP	332FFA
225	0058	0		LDCH	BUFFER,X	53A016
230	005B	0		WD	=X'05'	DF2012
235	005E	0		TIXR	T	B850
240	0060	0		JLT	WLOOP	3B2FEF
245	0063	0		RSUB		4F0000
252	0007	1		USE	CDATA	
253				LTORG		
	0007	1	*	=C'EOF'		454F46
	000A	1	*	=X'05'		05
255				END	FIRST	

Figure 2.12 Program from Fig. 2.11 with object code.

Line **Source statement**

```
  5    COPY      START   0               COPY FILE FROM INPUT TO OUTPUT
  6              EXTDEF  BUFFER,BUFEND,LENGTH
  7              EXTREF  RDREC,WRREC
 10    FIRST     STL     RETADR          SAVE RETURN ADDRESS
 15    CLOOP    +JSUB    RDREC           READ INPUT RECORD
 20              LDA     LENGTH          TEST FOR EOF (LENGTH = 0)
 25              COMP    #0
 30              JEQ     ENDFIL          EXIT IF EOF FOUND
 35             +JSUB    WRREC           WRITE OUTPUT RECORD
 40              J       CLOOP           LOOP
 45    ENDFIL    LDA     =C'EOF'         INSERT END OF FILE MARKER
 50              STA     BUFFER
 55              LDA     #3              SET LENGTH = 3
 60              STA     LENGTH
 65             +JSUB    WRREC           WRITE EOF
 70              J       @RETADR         RETURN TO CALLER
 95    RETADR    RESW    1
100    LENGTH    RESW    1               LENGTH OF RECORD
103              LTORG
105    BUFFER    RESB    4096            4096-BYTE BUFFER AREA
106    BUFEND    EQU     *
107    MAXLEN    EQU     BUFEND-BUFFER

109    RDREC     CSECT
110    .
115    .        SUBROUTINE TO READ RECORD INTO BUFFER
120    .
122              EXTREF  BUFFER,LENGTH,BUFEND
125              CLEAR   X               CLEAR LOOP COUNTER
130              CLEAR   A               CLEAR A TO ZERO
132              CLEAR   S               CLEAR S TO ZERO
133              LDT     MAXLEN
135    RLOOP     TD      INPUT           TEST INPUT DEVICE
140              JEQ     RLOOP           LOOP UNTIL READY
145              RD      INPUT           READ CHARACTER INTO REGISTER A
150              COMPR   A,S             TEST FOR END OF RECORD (X'00')
155              JEQ     EXIT            EXIT LOOP IF EOR
160             +STCH    BUFFER,X        STORE CHARACTER IN BUFFER
165              TIXR    T               LOOP UNLESS MAX LENGTH
170              JLT     RLOOP             HAS BEEN REACHED
175    EXIT      +STX    LENGTH          SAVE RECORD LENGTH
180              RSUB                    RETURN TO CALLER
185    INPUT     BYTE    X'F1'           CODE FOR INPUT DEVICE
190    MAXLEN    WORD    BUFEND-BUFFER

193    WRREC     CSECT
195    .
200    .        SUBROUTINE TO WRITE RECORD FROM BUFFER
205    .
207              EXTREF  LENGTH,BUFFER
210              CLEAR   X               CLEAR LOOP COUNTER
212             +LDT     LENGTH
215    WLOOP     TD      =X'05'          TEST OUTPUT DEVICE
220              JEQ     WLOOP           LOOP UNTIL READY
225             +LDCH    BUFFER,X        GET CHARACTER FROM BUFFER
230              WD      =X'05'          WRITE CHARACTER
235              TIXR    T               LOOP UNTIL ALL CHARACTERS
240              JLT     WLOOP             HAVE BEEN WRITTEN
245              RSUB                    RETURN TO CALLER
255              END     FIRST
```

Figure 2.15 Illustration of control sections and program linking.

Line	Loc	Source statement			Object code
5	0000	COPY	START	0	
6			EXTDEF	BUFFER,BUFEND,LENGTH	
7			EXTREF	RDREC,WRREC	
10	0000	FIRST	STL	RETADR	172027
15	0003	CLOOP	+JSUB	RDREC	4B100000
20	0007		LDA	LENGTH	032023
25	000A		COMP	#0	290000
30	000D		JEQ	ENDFIL	332007
35	0010		+JSUB	WRREC	4B100000
40	0014		J	CLOOP	3F2FEC
45	0017	ENDFIL	LDA	=C'EOF'	032016
50	001A		STA	BUFFER	0F2016
55	001D		LDA	#3	010003
60	0020		STA	LENGTH	0F200A
65	0023		+JSUB	WRREC	4B100000
70	0027		J	@RETADR	3E2000
95	002A	RETADR	RESW	1	
100	002D	LENGTH	RESW	1	
103			LTORG		
	0030	*	=C'EOF'		454F46
105	0033	BUFFER	RESB	4096	
106	1033	BUFEND	EQU	*	
107	1000	MAXLEN	EQU	BUFEND-BUFFER	
109	0000	RDREC	CSECT		
110			.		
115			.	SUBROUTINE TO READ RECORD INTO BUFFER	
120			.		
122			EXTREF	BUFFER,LENGTH,BUFEND	
125	0000		CLEAR	X	B410
130	0002		CLEAR	A	B400
132	0004		CLEAR	S	B440
133	0006		LDT	MAXLEN	77201F
135	0009	RLOOP	TD	INPUT	E3201B
140	000C		JEQ	RLOOP	332FFA
145	000F		RD	INPUT	DB2015
150	0012		COMPR	A,S	A004
155	0014		JEQ	EXIT	332009
160	0017		+STCH	BUFFER,X	57900000
165	001B		TIXR	T	B850
170	001D		JLT	RLOOP	3B2FE9
175	0020	EXIT	+STX	LENGTH	13100000
180	0024		RSUB		4F0000
185	0027	INPUT	BYTE	X'F1'	F1
190	0028	MAXLEN	WORD	BUFEND-BUFFER	000000
193	0000	WRREC	CSECT		
195			.		
200			.	SUBROUTINE TO WRITE RECORD FROM BUFFER	
205			.		
207			EXTREF	LENGTH,BUFFER	
210	0000		CLEAR	X	B410
212	0002		+LDT	LENGTH	77100000
215	0006	WLOOP	TD	=X'05'	E32012
220	0009		JEQ	WLOOP	332FFA
225	000C		+LDCH	BUFFER,X	53900000
230	0010		WD	=X'05'	DF2008
235	0013		TIXR	T	B850
240	0015		JLT	WLOOP	3B2FEE
245	0018		RSUB		4F0000
255			END	FIRST	
	001B	*	=X'05'		05

Figure 2.16 Program from Fig. 2.15 with object code.

Objektna koda Prilagoditveni zapisi

```
Loc       Source statement

0000  PROGA   START   0
              EXTDEF  LISTA,ENDA
              EXTREF  LISTB,ENDB,LISTC,ENDC
              .
              .
              .
0020  REF1    LDA     LISTA
0023  REF2   +LDT     LISTB+4
0027  REF3    LDX    #ENDA-LISTA
              .
              .
              .
0040  LISTA   EQU     *
              .
              .
0054  ENDA    EQU     *
0054  REF4    WORD    ENDA-LISTA+LISTC
0057  REF5    WORD    ENDC-LISTC-10
005A  REF6    WORD    ENDC-LISTC+LISTA-1
005D  REF7    WORD    ENDA-LISTA-(ENDB-LISTB)
0060  REF8    WORD    LISTB-LISTA
              END     REF1
```

Objektne koda Prilagoditveni zapisi

```
Loc       Source statement

0000  PROGB   START   0
              EXTDEF  LISTB,ENDB
              EXTREF  LISTA,ENDA,LISTC,ENDC
              .
              .
              .
0036  REF1   +LDA     LISTA
003A  REF2    LDT     LISTB+4
003D  REF3   +LDX    #ENDA-LISTA
              .
              .
              .
0060  LISTB   EQU     *
              .
              .
0070  ENDB    EQU     *
0070  REF4    WORD    ENDA-LISTA+LISTC
0073  REF5    WORD    ENDC-LISTC-10
0076  REF6    WORD    ENDC-LISTC+LISTA-1
0079  REF7    WORD    ENDA-LISTA-(ENDB-LISTB)
007C  REF8    WORD    LISTB-LISTA
              END
```

Objektna koda Prilagoditveni zapisi

```
Loc       Source statement

0000  PROGC   START   0
              EXTDEF  LISTC,ENDC
              EXTREF  LISTA,ENDA,LISTB,ENDB
              .
              .
              .
0018  REF1   +LDA     LISTA
001C  REF2   +LDT     LISTB+4
0020  REF3   +LDX    #ENDA-LISTA
              .
              .
              .
0030  LISTC   EQU     *
              .
              .
0042  ENDC    EQU     *
0042  REF4    WORD    ENDA-LISTA+LISTC
0045  REF5    WORD    ENDC-LISTC-10
0048  REF6    WORD    ENDC-LISTC+LISTA-1
004B  REF7    WORD    ENDA-LISTA-(ENDB-LISTB)
004E  REF8    WORD    LISTB-LISTA
```