

Estimate of minimum Running Size for  
the Next SETL System

The current estimate for the main storage requirement for the LITTLE-written SETL run time library is about 132,000 octal (46,080 decimal). This is equal to the size required to execute a short SETL program, as the code (BALM-machine instructions) resides in the storage heap, and an allowance has been included for the heap (10000 decimal for stack plus heap). The figure is contingent upon the LITTLE compiler's being modified to reuse compiler-generated temporaries. If this is not done, approximately 30,000 (octal) should be added.

The storage is used roughly as follows:

71,200	LITTLE code for SRTL
13,220	System routines and I/O buffers
25,100	Data (mostly heap space)
<hr/>	
131,520	Total

A more detailed estimate is given on the following pages. A suffix of "e" denotes an estimated value. For the others, the figure was obtained from a load map, and rounded to the nearest multiple of eight.

Note that better LITTLE code generation might reduce the LITTLE code by 1/3, or approximately 23K. It appears therefore that a minimal system close to 100K might be within reach.

## SRTL ROUTINES

NAME	DESCRIPTION	SIZE	OCTAL SUB- TOTALS
START	ENTRY POINT, INITIALIZER	720	
BALMINT	BALM INTERPRETER MAIN ROUTINE . . . . .	4160	
PACKER	PACKS BALM MACHINE INSTRUCTIONS	530	
EOJSTAT	PRINTS END OF JOB STATISTICS	360	6210
RSVSTK	RESERVE SPACE AT TOP OF STACK	40	
GETSTG	STORAGE ALLOCATION ROUTINE	50	
GET1STG	STORAGE ALLOCATION ROUTINE	40	
NOSPACE	TERMINATES JOB DUE TO LACK OF SPACE	10	
GARBCOL	GARBAGE COLLECTOR, MAIN ROUTINE	30	
GARBMRK	GARBAGE COLLECTOR, MARKING PHASE	260	
MARKBLK	GARBAGE COLLECTOR, MARKS ONE BLOCK	110	
AUXSTKO	GARBAGE COLLECTOR, AUXILIARY STACK OVERFLOW	10	
GARBAPT	GARBAGE COLLECTOR, POINTER ADJUSTING PHASE	140	
ADJPTR	GARBAGE COLLECTOR, ADJUST PTRS. IN STACK WD.	40	
ADJ1PTR	GARBAGE COLLECTOR, ADJUST ONE POINTER	40	
GARBCMP	GARBAGE COLLECTOR, COMPACTION PHASE	130	1200
GENINT	GENERATE INTEGER	120	
GENSINT	GENERATE SHORT INTEGER	40	
GENREAL	GENERATE REAL (FLOATING POINT)	30	
GENBOOL	GENERATE BOOLEAN STRING	120	
GENCHAR	GENERATE CHARACTER STRING	210	
GENLABL	GENERATE LABEL OBJECT	10	
GENSUBR	GENERATE SUBROUTINE OBJECT	10	
GENFUN	GENERATE FUNCTION OBJECT	10	
GENPAIR	GENERATE SPECIAL PAIR	40	
GENTUP	GENERATE TUPLE	60	
GENSET	GENERATE SET	220	1130
INTCHAR	SETL CHARACTER STRING TO INTEGER CONVERSION	160	
RELCHAR	SETL CHARACTER STRING TO REAL CONVERSION . . . . .	400e	
BSTCHAR	SETL CHARACTER STRING TO BOOLEAN STRING CONVERSION . . . . .	410	1170
CHARCNV	SETL OBJECT TO CHARACTER STRING CONVERSION	240	
CHARINT	SETL INTEGER TO CHARACTER STRING CONVERSION	130	
CHARREL	SETL REAL TO CHARACTER STRING CONVERSION	700e	
CHARBST	SETL BOOLEAN STRING TO CHARACTER STRING CONVERSION	760	
CHARCST	SETL CHARACTER STRING TO CHARACTER STRING CONVERSION	540	
CHARBLK	SETL BLANK ATOM TO CHARACTER STRING CONVERSION	110	
CHARLAB	SETL LABEL TO CHARACTER STRING CONVERSION	30e	
CHARSUB	SETL SUBROUTINE TO CHARACTER STRING CONVERSION	30e	
CHARFUN	SETL FUNCTION TO CHARACTER STRING CONVERSION	30e	
CHARUND	SETL UNDEFINED ATOM TO CHARACTER STRING CONVERSION	30	
CHARTUP	SETL TUPLE TO CHARACTER STRING CONVERSION	20	
CHARSET	SETL SET TO CHARACTER STRING CONVERSION	20	
LEFTPAD	MAKES A SETL STRING, LEFT PADDED WITH BLANKS	300	3620
TOKREAD	LEXICAL SCANNER FOR THE INPUT (READ) ROUTINE	450	
CHRNEXT	GETS NEXT CHARACTER FOR TOKREAD . . . . .	140	
PUTCHAR	ADDS LAST CHARACTER READ TO A STRING FOR TOKREAD	130	
FULLTOK	HOUSEKEEPING ROUTINE FOR TOKREAD	70	
ENDFILE	TESTS FOR END OF FILE; RETURNS SETL TRUE OR FALSE . . . . .	10e	1040
PRINTER	INITIALIZER I/O ROUTINES	50	
PRINTC	PRINTS AN ITEM WITH AN ABBREVIATION LABEL	350	
CHAROUT	CONVERTS OBJECTS TO CHARACTER STRINGS AND PRINTS THEM	1110	
POST	WRITES OUT AN ARBITRARILY LONG CHARACTER STRING	430	
OUTSTR	WRITES OUT A CHARACTER STRING ON ONE LINE	140	2320
ERRIMP	ERROR MESSAGE WRITER	10e	

ERRTYPE	ERROR MESSAGE WRITER	10e	
ERRVAL	ERROR MESSAGE WRITER	10e	
ERRMSG	ERROR MESSAGE WRITER	10e	
ERRIMPL	ERROR MESSAGE WRITER	10e	
ERRMIX	ERROR MESSAGE WRITER	10e	
DISPLAY	INTERNAL TO OCTAL OR HEX. CONVERSION	10e	70
HASH	HASHING ROUTINE	260	260
ATOM	SETL ATOM, X	20	
NELT	SETL +S (NUMBER OF ELEMENTS)	140	160
EQUAL	SETL X .EQ. Y, MAIN ROUTINE	1160	
EQBASIC	SETL X .EQ. Y, COMPARES ATOMS	420	1600
ELMT	SETL X + S, MAIN ROUTINE	100	
ELMTBST	SETL X + S, S A BOOLEAN STRING	250	
ELMTCST	SETL X + S, S A CHARACTER STRING	240	
ELMTTUP	SETL X + S, S A TUPLE	120	
ELMTSET	SETL X + S, S A SET	20	
ELSSMP	SETL X + S, S A SET, X NOT A TUPLE OF LENGTH ≥ 3	150	
ELSTUP	SETL X + S, S A SET, X A TUPLE	510	1630
AUGMENT	SETL S # S WITH, X, MAIN ROUTINE	50	
AUGAOK	SETL S # S WITH, X, ARGUMENTS OK (NOT CHECKED)	20	
AUGSIMP	SETL S # S WITH, X, X NOT A TUPLE OF LENGTH > 3	310	
AUGTUP	SETL S # S WITH, X, X A TUPLE	420	
TUPSPLY	BREAKS UP A TUPLE	140	
SETWTH1	SETL SX2, MAIN ENTRY	70	
SET1SMP	SETL SX2, X NOT A TUPLE OF LENGTH ≥ 3	100	
EXPAND	DOUBLES THE SIZE OF A HASH TABLE	240	1610
DIMINIS	SETL S # S LESS, X, MAIN ROUTINE	50	
DIMINOK	SETL S # S LESS, X, ARGUMENTS OK (NOT CHECKED)	20	
DIMSIMP	SETL S # S LESS, X, X NOT A TUPLE OF LENGTH > 3	270	
DIMTUP	SETL S # S LESS, X, X A TUPLE	470	
CONTRCT	HALVES THE SIZE OF A HASH TABLE	220	1270
DIMF	SETL S # S LESS, X, MAIN ROUTINE	30	
DIMFAOK	SETL S # S LESS, X, ARGUMENTS OK	450	500
ARB	SETL ARB, S, MAIN ROUTINE	60	
ARBBSTR	SETL ARB, S, S A BOOLEAN STRING	60	
ARBCSTR	SETL ARB, S, S A CHARACTER STRING	60	
ARBTUP	SETL ARB, S, S A TUPLE	30	
ARBSET	SETL ARB, S, S A SET	140	
ARBSIMP	SETL ARB, S, S A SET, TUPLES OF LENGTH ≥ 3 NOT REBUILT	70	500
NEXT	SETL ITERATION ← X + S, MAIN ROUTINE	60	
NEXTBIT	← X + S, S A BOOLEAN STRING	170	
NEXTCHR	← X + S, S A CHARACTER STRING	130	
NEXTCMP	← X + S, S A TUPLE	50	
NEXTMEM	← X + S, S A SET	1040	
NEXTMAA	ALLOCATES AN ADDRESS BLOCK FOR NEXTMEM	70	1600
OF	SETL F(X), RETRIEVAL, MAIN ROUTINE	100	
OFBSTR	SETL F(X), RETRIEVAL, F A BOOLEAN STRING	200	
OFCSTR	SETL F(X), RETRIEVAL, F A CHARACTER STRING	160	
OFTUPLE	SETL F(X), RETRIEVAL, F A TUPLE	100	
OFSET	SETL F(X), RETRIEVAL, F A SET	360	
OFN	SETL F(X1, ..., XN), RETRIEVAL	110	
OFA	SETL F SX2, RETRIEVAL	370	
OFAN	SETL F SX1, ..., XN2, RETRIEVAL	770	
OFB	SETL F(S), RETRIEVAL, MAIN ROUTINE	100	
OFBBOOL	SETL F(S), RETRIEVAL, S A BOOLEAN STRING	210	
OFBCHAR	SETL F(S), RETRIEVAL, S A CHARACTER STRING	210	
OFBTUP	SETL F(T), RETRIEVAL, T A TUPLE	160	
OFBSET	SETL F(S), RETRIEVAL, S A SET	150	
OFBN	SETL F(S1, ..., SN), RETRIEVAL	160	4060
SOF	SETL F(X), STORAGE, MAIN ROUTINE	100	

SOFBSTR	SETL F(X), STORAGE, F A BOOLEAN STRING	360	
SOFCSTR	SETL F(X), STORAGE, F A CHARACTER STRING	420	
SOFTUPL	SETL F(X), STORAGE, F A TUPLE	260	
SOFSET	SETL F(X), STORAGE, F A SET	130	
SOFN	SETL F(X1, ..., XN), STORAGE	120	
SOFA	SETL F SX2, STORAGE	240	
SOFAN	SETL F SX1, ..., XN2, STORAGE	270	
SOFB	SETL F(S), STORAGE	320	
SOFBN	SETL F(S1, ..., SN), STORAGE	450	
DIMFN	CHANGES A FUNCTION SO THAT F SX1, ..., XN2 IS NULL	1170	4540
COPY	COPIES ANY SETL OBJECT	400	
COPY1	COPIES ANY SETL OBJECT BUT ONLY ONE LEVEL DEEP	160	560
HEAD	SETL HD, X	50	
TAIL	SETL TL, X	110	160
PLUS	SETL X + Y, MAIN ROUTINE	120	
ADDI	SETL X + Y, INTEGERS	620	
ADDRREAL	SETL X + Y, REALS . . . . .	20e	
CONCATB	SETL X + Y, BOOLEAN STRINGS	630	
CONCATC	SETL X + Y, CHARACTER STRINGS	650	
CONCATT	SETL X + Y, TUPLES	220	
AUNION	SETL X + Y, SETS (UNION)	70	2770
MINUS	SETL X - Y, MAIN ROUTINE . . . . .	120	
SUBREAL	SETL X - Y, REALS . . . . .	20e	
BOOLDFF	SETL X - Y, BOOLEAN STRINGS	130	
SETDIFF	SETL X - Y, SETS . . . . .	100	
PMINUS	SETL =X (PREFIX MINUS) . . . . .	70	460
MULT	SETL X*Y, MAIN ROUTINE	220	
MULTI	SETL X*Y, INTEGERS	610	
MULTR	SETL X*Y, REALS	20e	
REPBOOL	SETL X*Y, X AN INTEGER, Y A BOOLEAN STRING	370	
REPCHAR	SETL X*Y, X AN INTEGER, Y A CHARACTER STRING	400	
INTSECT	SETL X*Y, SETS (INTERSECTION) . . . . .	160	2220
DIVIDE	SETL X/Y, MAIN ROUTINE	110	
DIVINT	SETL X/Y, INTEGERS . . . . .	1270	
DIVREAL	SETL X/Y, REALS . . . . .	20e	
DIVBOOL	SETL X/Y, BOOLEAN STRINGS (Y OR, NOT, Y)	120	
SYMDIFF	SETL X/Y, SETS (SYMMETRIC DIFFERENCE) . . . . .	30	1570
DSLASH	SETL X//Y, MAIN ROUTINE	100	
ABS	SETL ABS. X (ABSOLUTE VALUE)	70	170
INITLOG	INITIALIZES FOR BOOLAND, BOOLOR, AND BOOLEX	300	
BOOLAND	SETL X AND. Y	160	
BOOLOR	SETL X OR. Y	160	
BOOLEX	SETL X EXOR. Y (ALSO WRITTEN X//Y)	160	
BOOLIMP	SETL X IMPLIES. Y . . . . .	160e	
BOOLNOT	SETL NOT. X	140	1340
TYPE	SETL TYPE, X	40	
PAIR	SETL PAIR, X	30	70
NEWAT	SETL NEWAT. (NEW ATOM) . . . . .	30	30
MIN	SETL X MIN. Y . . . . .	50e	
MAX	SETL X MAX. Y . . . . .	50e	
BOT	SETL BOT. X (FLCOR) . . . . .	50e	
TOP	SETL TOP. Y (CEILING) . . . . .	50e	240
SUBSTR	SETL S(IIL), RETRIEVAL, MAIN ROUTINE	120	
SUBBOOL	SETL S(IIL), RETRIEVAL, S A BOOLEAN STRING	420	
SUBCHAR	SETL S(IIL), RETRIEVAL, S A CHARACTER STRING	620	
SUBTUPL	SETL S(IIL), RETRIEVAL, S A TUPLE	160	
VPSUBST	VERIFIES PARAMETERS FOR SUBBOOL, ETC.	120	1660
SSUBSTR	SETL S(IIL), STORAGE, MAIN ROUTINE . . . . .	110	
SSBBOOL	SETL S(IIL), STORAGE, S A BOOLEAN STRING . . . . .	230	
SSBCHAR	SETL S(IIL), STORAGE, S A CHARACTER STRING	220	

SSOTUPL	SETL S(IIL), STORAGE, S A TUPLE . . . . .	150	
VPSUBS	VERIFIES PARAMETERS FOR SSUBSTR, ETC.	120	1050
DEC	SETL DEC, X (INTEGER/CHAR, STRING DECIMAL CONVERSION)	60	
OCT	SETL OCT, X (INTEGER/CHAR, STRING OCTAL CONVERSION)	60	
BITR	SETL BITR, X, MAIN ROUTINE . . . . .	60e	
BITRINT	SETL BITR, X, X AN INTEGER (CONVERTS TO A BOOLEAN STR)	40e	
BITRR	SETL BITR, X, X REAL (BITR, BOT, X) . . . . .	30e	
BITRBST	SETL BITR, X, X A BOOLEAN STRING (CONVERTS TO INTEGER)	40e	350
LE	SETL X LE, Y, MAIN ROUTINE . . . . .	110	
LEINT	SETL X LE, Y, INTEGERS	240	
LEREAL	SETL X LE, Y, REALS	20e	
LEBSTR	SETL X LE, Y, BOOLEAN STRINGS (X IMPLIES Y EVERYWHERE)	320	
LESET	SETL X LE, Y, SETS (SUBSET TEST) . . . . .	70e	
GE	SETL X GE, Y, MAIN ROUTINE . . . . .	60	
GEINT	SETL X GE, Y, INTEGERS	240	
GEREAL	SETL X GE, Y, REALS . . . . .	20e	
GEBSTR	SETL X GE, Y, BOOLEAN STRINGS . . . . .	320e	
GESET	SETL X GE, Y, SETS (SUPERSET TEST) . . . . .	70e	
LT	SETL X LT, Y, MAIN ROUTINE . . . . .	60	
LTINT	SETL X LT, Y, INTEGERS	30	
LTREAL	SETL X LT, Y, REALS . . . . .	20e	
LTBSTR	SETL X LT, Y, BOOLEAN STRINGS . . . . .	320e	
LTSET	SETL X LT, Y, SETS (PROPER SUBSET TEST) . . . . .	70e	
GT	SETL X GT, Y, MAIN ROUTINE . . . . .	60	
GTINT	SETL X GT, Y, INTEGERS	30	
GTREAL	SETL X GT, Y, REALS . . . . .	20e	
GTBSTR	SETL X GT, Y, BOOLEAN STRINGS . . . . .	320e	
GTSET	SETL X GT, Y, SETS (PROPER SUPERSET TEST) . . . . .	70e	3250
POW	SETL POW(S) (POWER SET) . . . . .	70e	
NPOW	SETL NPOW(N, S) . . . . .	100e	
NEXPOW	ITERATOR FOR POW . . . . .	120e	
NEXNPOW	ITERATOR FOR NPOW . . . . .	300e	610
RANDOM	SETL RANDOM, X, MAIN ROUTINE . . . . .	60e	
RANINT	SETL RANDOM, X, X AN INTEGER . . . . .	60e	
RANREAL	SETL RANDOM, X, X A REAL . . . . .	40e	
RANBOOL	SETL RANDOM, X, X A BOOLEAN STRING . . . . .	20e	
RANCHAR	SETL RANDOM, X, X A CHARACTER STRING . . . . .	20e	
RANTUPL	SETL RANDOM, X, X A TUPLE . . . . .	20e	
RANSET	SETL RANDOM, X, X A SET . . . . .	60e	
RANBASE	BASIC RANDOM NUMBER GENERATOR . . . . .	100e	440
EXP	SETL X EXP, Y, MAIN ROUTINE . . . . .	140	
EXPII	SETL X EXP, Y, INTEGERS . . . . .	550	
EXPRI	SETL X EXP, Y, X REAL, Y AN INTEGER	100e	
EXPRR	SETL X EXP, Y, REALS	500e	
EXPIR	SETL X EXP, Y, X AN INTEGER, Y REAL	30e	1540
ALLOBIT	ALLOCATES SPACE FOR A BOOLEAN STRING	40	
ALLOCHR	ALLOCATES AND INITIALIZES A SETL LONG CHAR. STRING	40	
ALLOCOD	ALLOCATES SPACE FOR A CODE BLOCK	20	
ALLOTUP	ALLOCATES SPACE FOR A TUPLE	40	
TUPADD1	SETL T(+T+1) = X	140	
NORMINT	NORMALIZES AN INTEGER	220	
FORCELI	CONVERTS AN INTEGER TO LONG FORM	50	
LASTSUB	SETS MAXZZYZ AND MAXZZYY (MUST BE LAST)	10	620

SCOPE	SYSTEM, GETBA, SIO	2600	
LITTLE	INOUT, CALLRUN, READIOR, ETC., ETIME, PRTIME	570	
SCOPE	CPC, ACGOER, REMARK, ABORT, BACCHK, SBARGS, FTNBIN	460	
SCOPE	ENDFIL, INPUTB, INPUTC, KODER, KRAKER, OUTPTB, OUTPTC, REWINM, LDRUSX	3630	
LITINIT	Main program, includes I/O buffers	3320	13220
DATA	Miscellaneous variables, compiler temporaries	1500e	
STORAGE	Heap plus stack, at 10,000 decimal	23400e	25100

Grand Total: 131,520