COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MO. 63110

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# Users' Guide to LINC Variants

M. A. Clark

## Abstract

A summary chart outlines the main differences between the classic LINC, micro-LINC 7, micro-LINC-300, and LINC-8 that affect programming. The chart has been checked by D.E.C. and Spear, Inc.

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Differences indicated here are intended to enlighten, not alarm. For the most part program modifications which may be necessary between machines are trivial. The chart and notes are intended simply as a guide; your attention is called to the references given.

| Programs written for the: ↓ / are compatible with the: → | Classic LINC | μ-LINC 1 | μ-LINC 300 | LINC-8 (LINC mode) |
|---|---|---|---|---|
| Classic LINC | Programming the LINC, and "New LINC Instructions" memo 8/18/65, Computer Systems Lab., Washington Univ., St. Louis, Mo. 63110. | unless program uses: 4<br>unless μ-LINC 1 has: 3, 5 | unless program uses: 1, 2, 4, 6, 7 | unless program uses: 1, 2, 4, 7, 13 |
| μ-LINC 1 | unless program uses: 3, 4, 8 | Information from: SPeAR, Inc. Bear Hill Rd. Waltham, Mass. 02154 | unless program uses: 1, 2, 4, 6, 7, 8 | unless program uses: 1, 2, 4, 7, 8, 13 |
| μ-LINC 300 | unless program uses: 1, 3, 4, 9, 11, 12 | unless program uses: 1, 4, 9, 11, 12<br>unless μ-LINC 1 has: 2, 5 | Micro-LINC-300 Order Code, SPeAR, Inc., Bear Hill Rd., Waltham, Mass. 02154 | unless program uses: 1, 4, 9, 12, 13, 14 |
| LINC-8 (LINC mode) | unless program uses: 1, 3, 4, 10, 11 | unless program uses: 1, 4, 10, 11<br>unless μ-LINC 1 has: 2, 5 | unless program uses: 1, 4, 6, 10 | Small Computer Handbook, doc. C-800, and PROGOFOP, doc. DEC-L8-SFAO-D, D. E. C., Main St., Maynard, Mass. 01754. |

1. Programmed timing loops. Instruction cycle time: classic LINC and μ-LINC 1, 8 μsecs.; μ-LINC 300, generally 1 μsec.; LINC-8, generally 1.5 μsecs.
2. 8-bit SAM values.
3. 9-bit SAM values.
4. Printer output. Classic LINC: unbuffered teletype printer usually connected through bit 0, Relay Register, and held off with a one in bit 0.
   μ-LINC 1: as classic LINC, or connected through channel 2 (OPR 2).
   μ-LINC 300: as classic LINC, or buffered teletype (OPR 42), or buffered Kleinschmidt (OPR 45) printer. Kleinschmidt interprets vertical bar ASCII code as line feed.
   LINC-8: buffered teletype printer (OPR 14).
   There are other variations. (All machines have Soroban code as standard Keyboard input. A few individual installations, however, use ASCII.)
5. 0 potentiometers.
6. Potentiometers 4-7.
7. OPR 0-14.*
8. MTT (Magnetic Tape Two).**
9. Operations LMB***, UMB***, MSC 2 (Set Flag), MSC 3 (Proceed from Tape Pause), MSC 4 (TA to A), MSC 7 (Disable Interrupt), MSC 12 (Clear Flag), SKP 16 (Tape Transfer), SKP 17 (Flag), MTT**, OPR 0-14*, OPR 40-77.
10. Operations LMB***, UMB***, OPR 13 (PDP), OPR 14 (TYP), EXC, OPR 0-12*.
11. "Buffered" feature of 2nd word (block number) of tape instructions. The classic LINC and the μ-LINC 1 need this word in the memory until the tape operation is finished.
12. Shift key to present upper case keyboard values directly to ACC.
13. Tape blocks which may be occupied by the LINC-8 "Program of Operation," PROGOFOP (normally blocks 0-11).
14. Memory bank 0 (reserved for PROGOFOP).

*OPR 0-14 are compatible between the classic LINC and the μ-LINC 1, but not between these two, the μ-LINC 300, and the LINC-8. The timing pulse generation is different between the first two and the μ-LINC 300. The LINC-8 OPR requires PDP-8 programming. There are thus slight logical differences in using OPR for buffered printer output on the μ-LINC 300 and the LINC-8.

**The second tape transport is optional on the μ-LINC 1 and μ-LINC 300. The MTT instruction is compatible between machines which have the transport.
The LINC-8 may have a second transport, addressable, compatibly, with MTT by modifying PROGOFOP. It will not then have a general purpose EXC instruction.

***Memory bank selection logic is handled differently on the μ-LINC 300 and the LINC-8, although the LMB/UMB coding is the same. Either machine may have 4K to 32K words. The classic LINC and the μ-LINC 1 have 2048 words, not paged.

M. A. Clark
Computer Systems Lab., Washington Univ.
St. Louis, Mo. 63110 6/1/68