CUSTOMER ENGINEERING TESTS
FOR THE 1401 DATA PROCESSING SYSTEM

COMPLEMENT ADD

## Purpose of Test

To test the Complement Add circuitry by subtracting algebraically the A Field (subtrahend) from the B Field (minuend) and comparing the result (difference) with the Result Should Be Field. For unequal conditions the machine either stops to permit console checking or prints the results depending upon the setting of Sense Switch E.

The Complement Add circuitry is employed under the following conditions:

1. When an ADD OP CODE is used and the A Field and the B Field have unlike signs in the units position. Negative signs are indicated by a "B" bit (11 punch in a card). Any other "A" or "B" bit combination in the units position or no bit is considered a positive sign.

2. When a SUBTRACT OP CODE is used and the A Field and the B Field have like signs.

Similar to the True Add operation the result is developed in the B Field storage area, but unlike the True Add operation the values in the A Field are always complemented and added algebraically to the values in the B Field. As a result of this complement addition, a high-order carry is developed, thus eliminating the need for a recomplement cycle. Furthermore, the sign in the units position of the result (B Field storage area) is always generated in standard form, that is, "A" and "B" bits (12 punch in a card) for a positive result, but remain as a "B" bit for a negative result (11 punch in a card).

In this test, to prevent a recomplement cycle (no high-order carry), the absolute values punched in the B Field of the detail cards are always greater than those in the A Field.

## Units Required

1401 Processing Unit
1402 Card Reader or 729 Tape Drive
1403 Printer (optional)

| Operations Used | Code |
|---|---|
| Clear | (/) |
| Set Word Marks | (,) |
| Load | (L) |
| Add | (A) |
| Subtract | (S) |
| Compare | (C) |
| Branch | (B) |
| Print | (2) |
| Stop (error) | (.) |

## Method of Test

The complete test block consists of the following cards:

1. Title Card (0A)
2. Two Program Chaining Routine Cards (02-03)
3. Three Title and Headings Print Routine Cards (04-06)