CALCULATOR CORNER

Judging by the amount of mail I am now receiving, Calculator Corner is striking a chord with some of you out there who either cannot or don't want to own a micro. The general feeling seems to be that you'd like to see more software and advanced programming info. than I've been providing, so for the next few months that's what you're going to get!

Dick Pountain

TI 58/59 pseudo op-codes

We'll start off with some notes from reader, Rolf Howarth, of Wimborne, Dorset concerning various TI 58/59 operations which are not to be found in the manual.

"When a program is entered it is stored as a sequence of two-digit numbers, each of which corresponds to one or more key strokes. However, not all of the 100 possible codes (00-99) are used, and a 'pseudo' op-code can be placed in program memory by entering RCL nn and then deleting the RCL, leaving the code nn as required.

Keycode 82

This is the most useful pseudo code, and is normally referred to as HIR (this is the mnenomic printed when listing on the PC-100). With it one can access the eight internal registers used as the pending operations stack, and print register when the PC-100 is connected. The format of the instruction is 82 ab, where a is the operation and b the number of the register (1-8) on which the operation is performed. There are six different operations, which are used in the same manner as ordinary register arithmetic: 0 — STO store display contents in internal register; 1 — RCL recall contents of internal register to display; 3 — SUM add display to internal register; 4 — PRD multiply internal register by display contents; 5 — INVSUM subtract display contents from register; 6 — INVPRD divide register by display contents. 2 will perform no operation and 7, 8 and 9 all do the same as 6. Note: When performing register arithmetic with the pending operations registers, place the calculator in scientific display mode, as any number smaller than one will otherwise have its exponent made positive (eg. 0.02 turns into 200. after HIR 38).

These registers may be HIRed when the programmer has no spare data registers, though one has to take into account the fact that they are actually used by the calculator (!).

Keycode 31

This op-code corresponds to the LRN key, which can of course not be placed directly in program memory, as the calculator leaves learn mode when it is pressed. When the code is encountered during program execution, the calculator stops in learn mode at the following location.

Keycode 21

This code, which corresponds to the 'shift' key, 2nd, has several interesting uses. 1) Crashing the calculator. After the sequence 21 sin, cos or tan, the TI58/9 crashes, requiring it to be switched off to reset it. 2) 21 in front of a R/S or 31 instruction causes the next key pressed to have its second function taken. 3) Testing the display. It is possible to branch to one of two user-defined key labels as the result of testing whether the number in the display has been entered (ie. a function or operation key has been pressed since the number was keyed in). The sequence is 21 and then a user-defined key A-E'. The calculator jumps to one of two labels; if the number has been entered the first label will be called, otherwise the label search mechanism starts from step 001. So in the following example, when B is pressed one or other of the Lbl A's is called. The first Lbl A' must be at step 000 for this to work. Lbl A'. . INVSBR Lbl A'. . . INVSBR Lbl B 21 . A' . .

If the number has been entered the . will clear it and the first Lbl A' is called. The test may be reversed if CE is used in place of the point. The first label will be called if the number is unentered, and vice versa. Any error condition and/or unentered number will be cleared by the CE as normal.

DSZ

The decrement and skip on zero function may be used with any data register, not just registers 0-9 as stated by the manual. The number of the register has to be placed in the right place using the same method as when entering a pseudo code. Note that register 40 may not be used, as Dsz 40 is recognised as Dsz Ind.

Finally I would like to give the owners of a TI58/9 a puzzle to solve. It is possible to look at the 380 steps which contain the routines that do the polar to rectangular and sexagesimal to decimal conversions and statistics. I have found out how to do this, and wonder whether anyone else can."