Internal Report #39

IMP H/J GSE

Varian 520/i Software Summary

by

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Useful SRL Programs

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OF PROGRAMS
5-28-72

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10
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EOF

Obsolete SRL Programs

NAME	FUNCTION
BTP1	PI background test program
FTP1	PI function test program
MR1	PI master routine
CLEANUP	PI cleanup routine
WINDY JR	PI dump routine

Varian and Varian-Based Programs

ABC (Abbreviated Basic-Like Calculator)

ABC is a Basic-like interpretive language run under the ABC interpreter. A description of the language can be found in "Summary of ABC Language", Curt Widdoes, 11-15-71. A summary of the operation of the interpreter follows:

1. Starting address $032A
2. Latest assembly 10-1-71 1 part
   patches stage 1
3. The ABC interpreter wipes out MR2, therefore special procedures must be used in loading ABC.

   To load ABC from paper tape, use absolute loader #2 and proceed normally.

   To load ABC from mag tape, use MR2 to load 0000-18BF, then load the rest of ABC from paper tape using absolute loader #2. The portion of ABC which overlays MR2 is punched separately exactly for this purpose.

   MR2 must be reloaded after using ABC. Use the absolute loader #2 to load MR2, or else use absolute loader #2 to load MR2 bootstrap and then bootstrap MR2 in from mag tape.

Master Routine #2 (MR2)

1. starting addresses:

main start (command loop)	$1C00
tape initialization	$19AA
bootstrap	$1F90

2. latest assembly 1-9-72 and 1-11-72 2 parts

   patches stages 1,2

3. loading MR2 from paper tape: use absolute loader #2

4. bootstrapping MR2 from mag tape:

   place tape at load point

   place deck on line

   load MR2 bootstrap using absolute loader #2

   start at address $1F90

5. commands:

LEXX.	load and execute program XX (hex)
LRXX.	load program XX (hex) and return to command mode
B.	branch to Baid at address $164C
S.	store a new program (see 6 below)
I.	index a tape
R.	rewind to load point

6. After the S command, a program ID is required in the following format:

   NAME AND COMMENTS/XXXX-XXXX,XXXX-XXXX,XXXX-XXXX,XXXX!

   Up to three address fields may be specified. Addresses may be any hex numbers, zero-filled and right justified in a four-character field.

Background Test Program #2 (BTP2)

1. starting addresses:

full start (rewind tape)	$0100
restart (no rewind)	$0102

2. latest assembly 2-2-72 1 Part

   patches stages 1,2,3,4,5,6

3. load BTP2 from mag tape or paper tape, MR2 must be resident.

4. commands:

FXXXX.	rewind and go to file XXXX (decimal)
SXX.	write header at current position and record XX (decimal) records of quiescent data (will not write at file 0) XX=00 ⇒ record until SS1 depressed
E.	write trailer and EØF at current position (will not write at file 0)
B.	go to Baid at address $164C
M.	go to MR2 at address $1C00
C.	print command status & temperature
R.	rewind to load point

5. header-trailer options:

←	delete last item
control P	go to command mode
control D	start entire input over again
!	terminate input of current item

BTP2 (cont.)

6. sense switch options:

SS1	SS2	SS3	
1	x	x	stop recording at end of record
0	1	x	print rates each record
0	0	x	don't print rates each record
0	x	0	print new events
0	x	1	print error events

Note: since rate info is saved until it is printed, the first set of rates printed after SS2 is depressed may be a set that was accumulated in a previous subcom state.

7. the DMP program may be used to dump BTP2 tapes

8. TTY printout event error codes:

1	no subcom change after 32 events
2	readout ended too early
3	parity error in at least one nibble
4	read after write error
5	hazard true
6	$D5H \cdot \overline{D5}$
8	subcom change too soon

Note: ignore the first 8 error in a file if it occurs in the first record.

9. During recording of data, the TTY keyboard and reader are enabled. If a control P is sensed, recording will be terminated in the end of the

BTP2 (cont.)

current record.

Note: to insure that the control P is received, press repitition control P over an event-line boundary. Printing of events will stop when control P is received.

Function Test Program #3 (FTP3)

1. starting addresses:

full start (rewind)	$0100
restart (no rewind)	$0102

2. lastest assembly 2-2-72 1 part

   patches stages 1,2,3

3. Load FTP3 from mag tape or paper tape. MR2 must be resident.

4. commands:

FXXXX.	rewind and go to file XXXX (decimal)
S.	input and record header record and return to command mode
E.	input trailer record and record trailer and EOF, then return to command mode
B.	go to Baid at address $164C
M.	go to Master Routine at address $1C00
C.	print command status and temperature
R.	rewind to load point
TX_1X_2.	do test X_1X_2 (see 5 below)
Q.	print quiesent data on TTY

5. test types: (X_1 and X_2 are independent)

X_1	X_2
0 no paret test	0 no sector-bit test
1 short paret test	1 sector-bit test
2 long paret test	

Note: T00. ⇒ record quiescent data. FTP3 then asks for # of records.

FTP3 (cont.)

6. sense switch options during recording:

SS1	SS2	SS3	
1	x	x	stop recording at end of record
0	x	x	record indefinitely

7. sense switch options during printing

SS1	SS2	SS3	
1	x	x	stop printing after this event
0	1	x	do not print
0	0	0	print new events
0	0	1	print error events

8. error codes in TTY printout

1	no subcom change after 32 counts
2	readout ended early
3	parity error in at least one nibble
5	hazard true
6	$D5H \cdot \overline{D5}$
8	subcom change too soon

9. FTP3 will not write data or header or trailer records at file 0.

Function Test Program #2 (FTP2)

1. starting address:

	full start	$0DE1

2. latest assembly 7-26-71 1 part

   patches stages 1,2,3,4

3. Load FTP2 from magtape or paper tape. FTP2 is self contained.

4. commands:

B.	go to Baid at address $164C
C.	print command status
D.	print temperature
G__.	allow entry of comments
P___.	pulse and read out one event
Q.	print quiescent data
TX_{1X2}	perform test X_1X_2
Xab.	set up M1 and M2

5. Full details are contained in "FTP2 Documentation", Curt Widdoes, 8-2-71

DMP (dump program)

DMP dumps formatted (BTP2 format) tapes and unformatted tapes.

1. starting addresses

full start (rewind)	$0100
restart (no rewind)	$0102

note: restart does not mess up the file or record counters in DMP

2. latest assembly 1-20-72 1 part

patches stages 1,2,3,4,5

3. operating procedure:

First do a full start to rewind the tape and reset DMP. DMP will remember its position on the tape until some manual intervention makes that memory invalid.

Answer the opening dialogue as in this sample:

```
FIRST FNRN: 1,1.
LAST FNRN: 2,4.
HEX OR NORMAL: N.
OPTIONS: 1,0,1.
```

Each item is described below:

FIRST FNRN: Input a file number and record number (decimal). This will be the first record dumped.

LAST FNRN: Input a file number and record number (decimal). This will be the last record dumped.

HEX OR NORMAL: H => unformatted hex dump (and questions end here)
N => formatted dump (and OPTIONS: must be answered)

OPTIONS: Input X_1,X_2,X_3 where X_1,X_2,X_3 are each either 0 or 1 and have significance as follows:

X_1 1/0 => print/do not print header and trailer

X_2 1/0 => print/do not print temp, PCBE

X_3 1/0 => print/do not print rates

DMP (cont.)

4. sense switches control printing of events in the formatted dump as follows:

SS1	SS2	SS3	
0	x	x	no events printed
1	0	0	all events printed
1	1	x	all new events } can be together
1	x	1	all error events } can be together

5. In both formatted and unformatted dumps, the following information is printed out at the beginning of each record (one exception below)

FNRN XXX XXXX REC LEN XXXX ERRORS:

The FNRN item is the actual FNRN as counted by the DMP program. Errors that may appear are:

REREAD1 or REREAD2 for both formatted and unformatted

LEN (length) formatted only

CS (checksum) formatted only

The REREAD error indicates how many times the record was read and the hardware signalled that a parity error occured. The record will be read no more than three times.

Note that the LEN, CS, or REREAD2 errors cause the record in error to be dumped in the unformatted (hex) mode even if the formatted mode was selected.

The only time when the FNRN header information is not printed at the beginning of each record is when the formatted dump mode has been selected, SS1 = 0, and the option entries $X_1 = 1$, $X_2 = 0$, $X_3 = 0$, i.e., when only headers and trailers are being dumped.

DMP (cont.)

6. tape positioning:

   The DMP program remembers where the tape is and goes directly to the correct file and thence to the correct record without rewinding when the command dialogue is completed.

   For example: if the tape is at file 50 and DMP is dumping records and we want to abort the current dump in order to start at file 60, then proceed as follows:

   press step
   press reset
   load address $0102 (restart address)
   press run
   input the appropriate information

   The tape will not be rewound. DMP will proceed directly to file 60.

   Note that if we want to go to file 1 from file 50 it would be faster to start at address $0100 so that the tape will be rewound quickly.

7. When DMP has dumped the last record of the last file of data on a tape, but has been commanded to print more files, it will either loop re-reading the EOF and printing EOF on the TTY, or it will read on toward the end of the tape. In either case, the operator is likely to become aggravated. This problem is too trivial to warrant fixing. The operator should know which file is the last file on the tape.

Calibration Program #1 (CTP1)

1. starting address $0DE1
2. latest assembly 3-25-71 3 parts

   patches stages 1,2,3A,4A,5A,6A,7A,8,9
3. Load CTP1 from magtape or paper tape. It is self contained.
4. When CTP1 starts it asks the following questions and expects answers as below:

```
REMOTE C
DATE: 5-7-72 AND I CAN WRITE LOTS OF COMMENTS HERE.
OPTION: 1.
DETECTORS: 01,02,03,07.
CHANNELS: 0500,0700,0678,1234,
2000,2345,1234,1234,0987,6789,1234,5432,5678.
```

Each item is described below:

REMOTE — put fluke supply in remote, turn on paper tape punch, and type C

DATE: — enter date and comments for CALAN

OPTION: — 0 => 1000 pulse sample 1 => 10000 pulse sample

DETECTORS: — enter each detector number in zero filled decimal

← at beginning of a number field restarts detector input; illegal character inside a number field => ? is typed and field input is restarted

CHANNELS: — enter each channel number in zero filled decimal; only 32 channels allowed.

← at beginning of a number field restarts channels input; illegal character inside a number field => ? is typed and field input in restarted.

CTP1 (cont.)

< at beginning of number field => delete the last existing field if there is at least one

Note: S. as the first characters of the detectors or channels input => use the standard detector or channel table.

See next page for a printout demonstrating the special options.

too large

illegal in detector input

```
REMOTE C.
DATE: THIS IS A SAMPLE.
OPTION: 0.
DETECTORS: 01,02,12?11,<?10,02.
CHANNELS: 0100,0200,0300,<0299,0400,0500,0<?0600.
```

detector

channel

not first character

illegal as first character

detector continuation line

```
REMOTE C.
DATE: THIS IS A SAMPLE.
OPTION: 1.
DETECTORS: 01,02,0-??04,05,06,-
DETECTORS: 01,02,03,04,05-?-
DETECTORS: 01,0??02.
CHANNELS: 01,?0001,0002,-
CHANNELS: 0001,0002-?-
CHANNELS: 0001,0002,0003.
```

not first character

detector line

not first character

```
REMOTE C.
DATE: THIS IS A SAMPLE.
OPTION: 0.
DETECTORS: 01,02,03,
04,05.
CHANNELS: 0001,0002,0003,0005
,0006,00
07,0008,-
CHANNELS: 5.
```

note that a carriage return - line feed is legal in the detector and channel input

Calibration Analysis (CALAN)

This program performs analysis of a calibration paper tape produced by CTP1 (calibration program #1) assembled 3-25-71. Operate as follows:

1. Load CALAN from magtape or paper tape (it is self contained)
2. Start at address $0DE1
3. Feed in calibration tape, starting at blank leader
4. Let program run until tape is through
5. Feed in next tape
6. Continue until done.

Note: Latest assembling 7-6-71 Patches stages 1,2,3

Check Out Peripheral Equipment (COPE)

This program checks out the Fluke power supply and GR counter. Operate as follows:

1. Load program COPE from magtape or paper tape. COPE is self contained.
2. Set up hardware. EIS need not be connected.
3. Start COPE at address $010F
4. Repeat the following sequence until each bit of the GR counter has been checked:
    a. set up a number in GR counter using 10 MHz pulses internal to GR counter
    b. press run
    c. compare number printed with GR counter number (they should be equal)

    Note: if SS1 is depressed the counter will be enabled and reset immediately after the number is printed over the TTY.
5. Set up the Fluke DVM to monitor the Fluke supply voltage
6. Start COPE at address $014A.
7. Put Fluke in remote.
8. Perform the following procedure:

    press run

    verify output voltage 10 μV, 20 μV ... 90 μV, 0

    press run

    verify output voltage 10 μV, 20 μV ... 90 μV, 0

    press run

    verify output voltage 100 μV, 200 μV, ... 900 μV, 0

    press run

    verify output voltage 1 V, 2 V, ... 9 V, 0

COPE (cont.)

9. Test is completed

Note: Latest assembly 6-23-71 Patches stage 1

Gaid #1:

VDM #92U0203-009A 5-28-70

0B04--0FC2;0E2E

Absolute Loader #1:

VDM #92U0303-054A 5-28-70

1FAE-1FFF (Bootstrap format)

Absolute Loader #2:

Identical to Absolute Loader #1 with the following exceptions:

1FAE-1FC2 has been modified to simplify the operating procedure.

Operating procedure changes:

Q and C need not be set. After loading the Absolute Loader #2 with the Bootstrap Loader, proceed as follows:

1) Set P as follows:

a) P = 1FB3 to halt after loading.

b) P = 1FB7 to continue after loading.

2) Run.

1FAE-1FFF (Bootstrap format)

Relocating Assembler #1:

VDM #92U0303-004C 4-8K 3-15-70

0000-0EED;0000

Relocating Assembler #2:

Identical to Relocating Assembler #1, with the following exceptions:

0009 107E 400 Bytes literal definitions

000B 1146 50 Literal symbolic definitions

000D 17FC 429 Symbols

Operating procedure is identical.

0000-0EED;0000

Power Fail-Restart #1:

VDM #92U0103-074B 4-02-70

0000-0002,0020-00DD;0000

Power Fail-Restart #2:

Identical to Power Fail-Restart #1 with the following exceptions:

Reassembled in sector #5, 1742-17FF.

Operating procedure is identical, except all halts are displaced from their Power Fail-Restart #1 positions by 1722_{16}.

0000-0002,1742-17FF;1820

Absolute Assembler #1:

VDM #92U0303-002C 1-07-70

0000-0ECC;0000

Absolute Assembler #2:

Identical to Absolute Assembler #1, with the following exceptions:

0E67	17FC	439 Symbols
0EC2	1058	400 Bytes literal definitions
0EC4	1120	50 Literal symbolic definitions

Operating procedure is identical.

0000-0ECC;0000

Absolute Assembler #3:

VDM #92U0303-002D 8-20-70

0000-0EF6;0000

This version corrects the BRM=37 problem

Absolute Assmebler #4:

Identical to Absolute Assembler #3, with the following exceptions:

0EC2	17FC	Do not destroy Master Routine

Operating procedure is identical.

0000-0EF6;0000

MTA is a modification of Absolute Assembler #4. It allows listing the assembly listing output on magnetic tape.

Operating procedure:

(1) Load Absolute Assembler #4.

(2) Overlay with MTA patch assembled 1-29-72. MR2 must be resident.

(3) Put blank tape on mag tape unit at load point

(4) Start at address $16E5. Computer will halt at 0

(5) Set SS1, SS2, SS3 down for pass 1

(6) Press run. Computer will halt without printing.

(7) Enter $C1 into C register

(8) Press run.

(9) Turn on paper tape reader to read source tape.

(10) When computer halts, start pass 2 as in normal assembly. Listing will be printed on mag tape

(11) When computer halts, load address $16FA and press run in order to write EOF. Computer will halt at 0.

(12) Punch object tape leader manually

(13) Start pass 3 as in normal assembly. Press space to begin to read.

To list the mag tape on the PDP-10 proceed as follows:

① Duplicate from 9T to 7T on PDP-11 using KENDUP

② Reformat from 7T to 9T using RFRM-11

③ List reformatted tape on PDP-10

Baid #1:

VDM #92U0203-008A 8K 5-28-70

1CB3-1FC2;1E4C

Baid #2:

Identical to Baid #1 with the following exceptions:

Location is sector #5, 14B3-17C2.

Operating procedure changes:

BRU to 157C

BRM to 157A

14F3-17C2;164C

Linking Loader #1:

VDM #92U0303-052A 8K 4-17-70

1CFF-1FC2,1CFF

Linking Loader #2:

Identical to Linking Loader #1 with the following exceptions:

Location is sector #5, 14EE-17C2.

Operating procedure changes:

To start P = 14EF, Q = 16E8.

14EE-17C2,14EE