* Powerful Repertoire
* Fast Execution
* Adequate Memory
* High Memory Bandwidth
* Fast Swap Rate
* Large Files
* Versatile Mapping
INSTRUCTION REPERTOIRE

• 48 BIT FLOATING POINT
• 24 BIT FIXED POINT
• 1-24 BIT CHARACTER
• REGISTER MANIPULATION
• REENTRANT LINKAGE
• EXPANDED POP FACILITY
• COMPLETE COMPARISONS
• GENERAL SHIFTS
• TRACE FACILITY
EXECUTION SPEED

1. INSTRUCTION "LOOK-AHEAD"
2. ADVANCE OPERAND FETCH
3. MULTIPLE SIMULTANEOUS MEMORY ACCESS
4. TYPICAL EXECUTION TIMES

FIXED ADD .300\mu s
FLOATING ADD 2.0\mu s
SHIFTS .3-.7\mu s
LOAD FIELD 1.0\mu s
MEMORY

* 64 K - 256 K words (24 bits + parity)

* Independently accessible in 8K modules

* Transfer rates up to $8 \times 10^6$ words/sec

* Independent access by CPU, DRUM, other I/O
SWAP FACILITY

1,000,000 word drum
2K word records
$1.1 \times 10^6$ words/sec transfer rate
35 ms. max access time
17 ms. average access time
up to 8 drums available per system
MASS FILES

140,000,000 WORD DISK

39×10³ WORD/SEC.
AV. TRANSFER RATE

170 MS MAX ACCESS

25 MS AVERAGE ACCESS
(no head movement)

UP TO 8 DISK FILES
PER DISK CONTROLLER
MEMORY MAPPING

* User memory is 8 2K pages (all mapped)

* System memory is 6 mapped 2K pages, 8 mapped 256 word pages, and 1 unmapped 2K page

* Protection for each page against:

  - READING
  - WRITING
  - EXECUTION
  - PRIVILEGED EXECUTION

* Map notes memory access and modification
AND

EACH TELETYPING CONTROLLER HANDLES 32 FULL-DUPLEX LINES

UP TO 8 TTY CONTROLLERS MAY BE USED (256 TTY'S)

the Usual

400 CPM CARD READER
120 CPM CARD PUNCH
600 LPM PRINTER
75 IPS MAG TAPES
7 or 9 TRACK
ORGANIZATION
OF
THE
SCC-6700
OVERALL ORGANIZATION
LOOKAHEAD

EXECUTION UNIT
Fixed-point 2's complement fraction multiply & divide

Floating point - (2 words)
2's complement 39 bit fraction
2's complement 9 bit exponent
May begin in even or odd location!

Numeric data
<table>
<thead>
<tr>
<th>SXP</th>
<th>OPC</th>
<th>I</th>
<th>ADDR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1 1</td>
<td>6 1</td>
<td></td>
<td>14</td>
</tr>
</tbody>
</table>

14 bit address field
6 bit op code
X is index bit
I is indirect address bit
P for programmed operator
S for system call
<table>
<thead>
<tr>
<th>LNG</th>
<th>OFF</th>
<th>ADDR</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5</td>
<td>14</td>
</tr>
</tbody>
</table>

LNG is length of field ($\leq 24$)
OFF is first bit of field ($\leq 23$)
ADDR is address of start of field

Fields may over-lap word boundaries

FIELD DESCRIPTOR
LDA - LOAD A REGISTER
STA - STORE A REGISTER
XMA - EXCHANGE MEMORY & A
LDB - LOAD B REGISTER
STB - STORE B REGISTER
LDX - LOAD INDEX REGISTER
STX - STORE INDEX REGISTER
XMX - EXCHANGE MEMORY & X
STM - STORE UNDER MASK
LDD - LOAD DOUBLE
STD - STORE DOUBLE

LOADS/STORES
LDF - LOAD FIELD
STF - STORE FIELD
LDFx - LOAD FIELD INDEXED
STFx - STORE FIELD INDEXED
LDfI - LOAD FIELD & INCREMENT
STfI - STORE FIELD & INCREMENT

FIELD LOADS/STORES
1. \((Q)_{0-4} \rightarrow \text{LNG}\)
2. \((Q)_{5-9} \rightarrow \text{OFF}\)
3. IF LNG = 378, \(X_{0-4} \rightarrow \text{LNG}\)
4. IF OFF = 378, \(X_{5-9} \rightarrow \text{OFF}\)
5. IF LNG > 24_{10}, TRAP
6. IF OFF > 23_{10}, TRAP

**FIELD SPECIFICATION**

**PREPARATION**
1. IF \( \text{OFF}_1 = \text{OFF}_2 \) and \( \text{ADDR}_1 = \text{ADDR}_2 \), NOP

2. LOAD (or store) FIELD

3. \( \text{OFF}_1 + \text{LNG} \Rightarrow \text{OFF}_1 \)
   if \( \leq 23 \), else
   \( \text{OFF}_1 + \text{LNG} - 24 \Rightarrow \text{OFF}_1 \)
   \( \text{ADDR}_1 + 1 \Rightarrow \text{ADDR}_1 \)
APPEND STRING A to B

LDI A
BRU done
STF B
BSL overflow
BRU * - 4
ADD - ADD TO A
SUB - SUBTRACT FROM A
MPY - MULTIPLY
DIV - DIVIDE
ADM - ADD A to MEMORY
MIN - MEMORY INCREMENT
MDS - MEMORY DECREMENT & SKIP
ADX - ADD TO INDEX REGISTER

(Note: Carry & Overflow are set when sums are placed in A)

Fixed Arithmetic
AND-LOGICAL AND TO A ORA-LOGICAL OR TO A EOR-LOGICAL EXCLUSIVE OR TO A LOGICAL OPERATIONS
FAD-FLOATING ADD
UFA-UNNORMALIZED FLOATING ADD
FSB-FLOATING SUBTRACT
UFS-UNNORMALIZED FLOATING SUBTRACT
FMP-FLOATING MULTIPLY
FDV-FLOATING DIVIDE

FLOATING POINT
SKE - SKIP ON A EQUAL to MEMORY
SKU - SKIP UNEQUAL
SKG - SKIP ON A GREATER
SKL - SKIP ON A LESS or EQUAL
SKEM - SKIP ON MASKED EQUALITY
SKUM - SKIP ON MASKED UNEQUAL
SKN - SKIP IF MEMORY NEGATIVE
SKP - SKIP IF MEMORY POSITIVE
SKA - SKIP ON A & MEMORY ZERO
SKB - SKIP ON B & MEMORY ZERO
SKC - SKIP & CLEAR FLAG

SKIP TESTS
BRU - BRANCH UNCONDITIONAL
BSL - BRANCH & SAVE LOCATION
BIX - BRANCH & INCREMENT X
BDX - BRANCH & DECREMENT X
BRI - BRANCH & RESTORE INTERRUPTS

BRANCHING
BSL

\(a + 1\)

\(\text{BSL}\)

\(\text{b}\)

\(\text{ZRO}\)

\(c\)

\(\text{BRUXC}\)

\(\text{a + 1}\)
POP

\[ \chi \]

100

\[ \text{EXECUTE} \]

BSL \[ b \]

\[ a \]

\[ a+1 \]

\[ \chi \]

\[ b \]

\[ \text{ZRO} \]

\[ c \]

\[ \text{BRU*} \]

\[ c \]

\[ a+1 \]

\[ \chi \]

POP'S
C = shift count \pm 0\text{-}63 positions

V = vacated position values
    0\textasciitilde, 1\textasciitilde, sign, sign comp

R = Registers shifted
    A, B, AB, A and B

S = Shift Type
    logical - Arithmetic

D = Direction
    left - Right
    (C is a signed shift)

Any length shift in 700 ms.

Shifts
EAX - EFFECTIVE ADDRESS TO X
SHF - SHIFT
XEC - EXECUTE
XCI - EXECUTE INDIRECT
OPR - OPERATE MICROINSTRUCTION
  A NORM - FD INTO BIT LENGTH
  B NORM - BIT LENGTH INTO FD
  NORM - NORMALIZE FD
  FIX - FLOAT TO FIX CONVERSION
  FLT - FIX TO FLOAT CONVERSION
  FNG - FLOATING NEGATE
  FRD - FLOATING ROUND
SWP - GENERAL REGISTER SWAP
AOP - ARITHMETIC OPS on REGISTERS
LOP - LOGICAL OPS on REGISTERS
RIN - REGISTER INCREMENTS & TEST

(MAND MANY OTHERS)

MISCELLANEOUS
EXECUTE INDIRECT

- Execution of simple instruction
- Execution of successful skip
- Execution of successful branch
SWP - SWAP
LRO - LOGICAL REGISTER OPS
ARO - ARITHMETIC REGISTER OPS
RIN - REGISTER INCREMENT
BTO - BIT TEST OP
PFM - PERFORM GROUP

OPERATE GROUP
FLT - CONVERT TO FLOATING POINT
FIX - CONVERT TO FIXED POINT
FRND - FLOATING ROUND
FNEG - FLOATING NEGATE
A NRM - A NORMALIZE 0D
B NRM - B NORMALIZE 0D
NRM - NORMALIZE 0D
LLO - LOCATE LEADING ONES
LLZ - LOCATE LEADING ZERO
LLT - LOCATE LEADING TRANSITION
CNT - COUNT BITS

PERFORM GROUP
MONITOR PG1 MAPPING
PN - ACTUAL PAGE NUMBER
AC - ACCESS MARK
MD - MODIFICATION MARK
AK - ACCESS KEY

no access
read, write
execute only
execute privileged
read, execute
read, execute privileged
read, write, execute
read, write, execute privileged

MEMORY MAP REGISTER
40 PRIVILEGE ERROR
41 UNDEFINED OP-CODE
42 WRITE ERROR
43 READ ERROR
44 EXECUTE ERROR
45 FLOATING OVERFLOW
46 INTERVAL TIMER
47 NON-EXISTENT MEMORY
50 RETURN TO USER MAP
51 PARITY ERROR
52 FD SPECIFICATION ERROR

TRAP LOCATIONS
**CH** - Character to be transmitted

**TTY** - Teletype Number

**T** = I do not transmit CH

**C** = I interrupt on transmission complete

**TELETYPE I-O FORMAT**
32 BANDS

1 BLOCK IS 256 WORDS

1 Band is 25 bits wide

WORDS PER BAND = 32,768
TOTAL WORD = 1,048,576
TRANSFER RATES = 1.1 MHz
INTERBLOCK GAP = 15 μsec
AVERAGE ACCESS = 17 MS
MAX ACCESS = 35 MS

DRUM FORMAT
SCC maintains complete support activities for its users. Installation and maintenance services are available through SCC offices strategically located throughout the United States. For pre-procurement demonstration of hardware and programs in Dallas, contact local sales office or the Marketing Department in Dallas.

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Printed in U.S.A.