**Micro-instructions**

**Fetch & Decode:**

1. PCout, MARin, Rd, IncPc
2. PCin(incrementor), MDRout, IRin

**Two-Operand Instructions:**

* MOV
  1. SOURCEout,Yout, NopA, Zin
* ADD
  1. SOURCEout, Yout, ADD, Zin
* ADC
  1. SOURCEout, Yout, ADC, Zin
* SUB (Dest – Src)
  1. SOURCEout, Yout, SUB, Zin
* SBC
  1. SOURCEout, Yout, SBC, Zin
* AND
  1. SOURCEout, Yout, AND, Zin
* OR
  1. SOURCEout, Yout, OR, Zin
* XNOR
  1. SOURCEout, Yout, XNOR, Zin
* CMP
  1. SOURCEout, Yout, SUB,Zin

**One-Operand Instructions:**

* INC
  1. SOURCEout,Yout, IncA, Zin
* DEC
  1. SOURCEout,Yout, DecA, Zin
* CLR
  1. SOURCEout,Yout, Clear, Zin
* INV
  1. SOURCEout,Yout, NotA, Zin
* LSR
  1. SOURCEout,Yout, LSR\_B, Zin
* ROR
  1. SOURCEout,Yout, ROR\_B, Zin
* RRC
  1. SOURCEout,Yout, RRC\_B, Zin
* ASR
  1. SOURCEout,Yout, ASR\_B, Zin
* LSL
  1. SOURCEout,Yout, LSL\_B, Zin
* ROL
  1. SOURCEout,Yout, ROL\_B, Zin
* RLC
  1. SOURCEout,Yout, RLC\_B, Zin

**Branching:**

1. PCout, Yin
2. DecoderOffsetOut, Yout, ADD, Zin
3. Zout, PCin
4. END

**JSR:**

1. PCout, MARin, Rd, IncPc, Yin
2. MDRout, Yout, ADD, Zin, PCincr.in, SPoutDec
3. PCout, MDRin, SPinDec
4. SPout, MARin, Wr
5. Zout, PCin

**Interrupt:**

1. FlagOut, MDRin, SPoutDec
2. SPinDec
3. SPout, MARin, Wr, SPoutDec
4. PCout, MDRin, SPinDec
5. SPout, MARin, Wr
6. IntAddressOut, PCin

**IRET:**

1. SPout, MARin, Rd, SPoutInc
2. MDRout, FlagIn, SPinInc
3. SPout, MARin, Rd, SPoutInc
4. MDRout, PCin, SPinInc

**RTS:**

1. Spout, MARin, Rd, SPoutInc
2. MDRout, PCin, SPinInc

**Fetch Source:**

**Register Direct:**

1. Rsrcout, SOURCEin

**Register Indirect:**

1. Rsrcout, SOURCEin
2. SOURCEout, MARin, Rd
3. MDRout, SOURCEin

**Auto Increment:**

1. Rsrcout, SOURCEin
2. SOURCEout, MARin, Rd, Zin, Inc
3. Zout, Rsrcin
4. MDRout, SOURCEin

**Auto Decrement:**

1. Rsrcout, SOURCEin
2. SOURCEout, Dec, Zin
3. Zout, Rsrcin, MARin, Rd
4. MDRout, SOURCEin

**Indexed:**

1. Rsrcout, SOURCEin
2. PCout, MARin, Rd, IncPc
3. MDRout, Yin, PCincr.in
4. SOURCEout, Yout, Add, Zin
5. Zout, MARin, Rd
6. MDRout, SOURCEin

**Extra memory fetch for (Auto Increment/Auto Decrement/Indexed) Indirect:**

1. MDRout, MARin, Rd
2. MDRout, SOURCEin

**Fetch Destination:**

**Register Direct:**

1. Rdstout, DESTin

**Register Indirect:**

1. Rdstout, DESTin
2. DESTout, MARin, Rd
3. MDRout, DESTin

**Autoincrement:**

1. Rdstout, DESTin
2. DESTout, MARin,Rd,Inc,Zin
3. Zout, Rdstin
4. MDRout, DESTin

**Autodecrement:**

1. Rdstout, DESTin
2. DESTout, Dec, Zin
3. Zout, Rdstin, MARin, Rd
4. MDRout, DESTin

**Indexed:**

1. Rdstout, DESTin
2. PCout, MARin, IncPc, Rd
3. PCin(incrementor), MDRout, Yin
4. DESTout, Yout, Add, Zin
5. Zout, MARin, Rd
6. MDRout, DESTin

**Extra memory fetch for (Auto Increment/Auto Decrement/Indexed) Indirect:**

1. MDRout,MARin,Rd
2. MDRout, DESTin

**Save in Destination:**

**Register direct:**

Zout, Rdstout

**Else:**

Zout, MDRin, Wr