**Roll No**: 20P-0101

Name: Muhammad Sherjeel Akhtar

**Subject**: Computer Organization And Assembly

Language

Lab Report: 4

**Submitted To Respected Sir: Usman Abbasi** 

Introduction:

We are going to write a few codes today just like we've written in the previous 2 reports.

The codes which we are going to write today are as follow:

# Today's Code:

1: Simple Addition

2: SWAP

**3: LOOP** 

So first of all we'll create .asm file with the code written in them and setup the dosbox. Here is the short preview of setting up the dosbox.

# **Setting UP Dos-Box:**

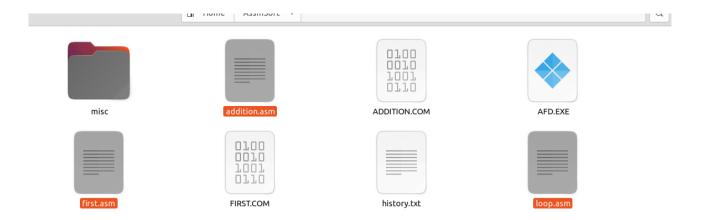
Mounting the drive.

```
Z:\>SET BLASTER=A220 I7 D1 H5 T6
Z:\>mount x ~/AssmSoft
Drive X is mounted as local directory /home/divine/AssmSoft/
Z:\>_
```

# Now we write x:,



Now we'll create 3 files and write the code of each program of assembly language in the respective files and save them with the extension .asm



Now we will assemble these files in the dosbox.

```
X:\>nasm addition.asm -o addition.com
nasm: fatal: unable to open input file `addition.asm'

X:\>nasm addition.asm -o addition.com

X:\>nasm swap.asm -o swap.com

X:\>nasm loop.asm -o loop.com

X:\>
```

As you can see three compiled files are created.



Now we will look at the code of each program separately,

# 1: Addition:

We will have the simplest code of addition at the start here is the code.

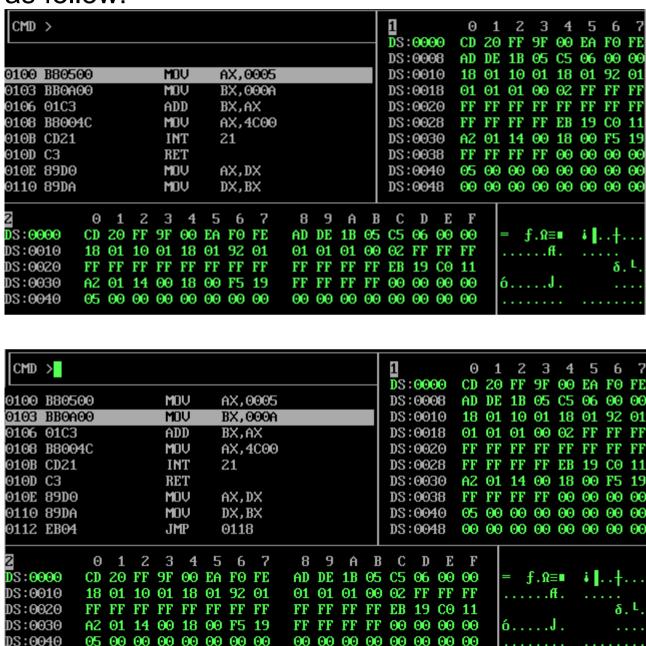
### Code:

[org 0x010000] mov ax, 5 mov bx, 10 add bx, ax

# mov ax, 0x4c00 int 0x21

### **Execution:**

The execution of addition program in dosbox is as follow:



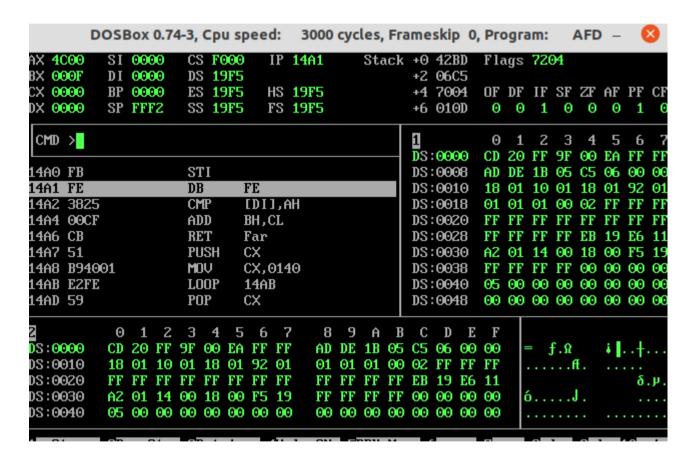
2ProcStep 3Retrieve 4Help ON 5BRK Menu 6

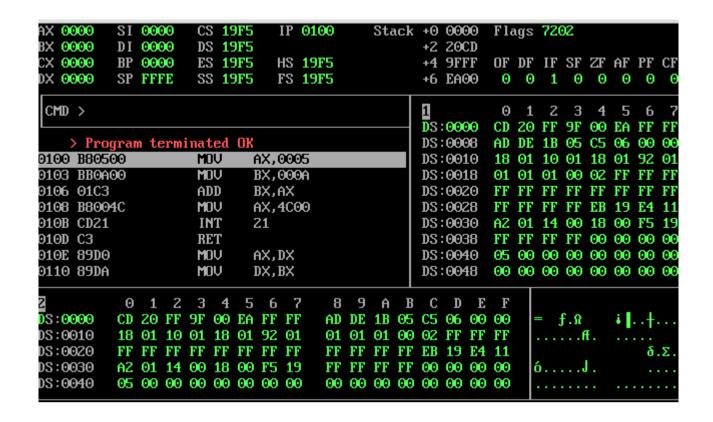
7 up 8 dn

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9108 B8004	łC			M	)V	f	ìX,4	1C00					DS	:001	18	01	01	01	$\Theta\Theta$	02	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	FF
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910D C3				RI	EΤ								DS	:002	28	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{E}\mathbf{B}$	19	CO	11
910E 89D0				M	)V	f	I,Xf	X					DS	:003	30	A2	01	14	00	18	00	F5	19
9110 89DA				M	)V	1	X,I	ВX					DS	:003	38	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	00	99	00	00
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9114 31DZ				X	DR	1	X,I	X					DS	:004	<del>1</del> 8	00	00	00	99	<b>00</b>	00	00	00
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0108 B8004C	MOV	AX,4C00	DS:0000 CD 20 DS:0008 AD D		
010B CD21		21	DS:0010 18 0		01 92 01
010D C3	RET		DS:0018 01 0	1 01 00 02	FF FF FF
010E 89D0	MOV	AX,DX	DS:0020 FF F	F FF FF FF	FF FF FF
0110 89DA	MOV	DX,BX	DS:0028 FF F	F FF FF EB	19 CO 11
0112 EB0 <del>1</del>	JMP	0118	DS:0030 A2 0	1 14 00 18	00 F5 19
0114 31D2	XOR	DX,DX	DS:0038 FF F	F FF FF 00	00 00 00
0116 3100	XOR	AX,AX	DS:0040 05 0	9 00 00 00	00 00 00
0118 8956E4	MOV	[BP-1C],DX	DS:0048 00 0	9 00 00 00	00 00 00
2 0 1	2 3 4 5	6789AI	C D E F		
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DS:0020 FF FF 1	FF FF FF FF	FF FF FF FF FF	EB 19 CO 11		δ. <sup>L</sup> .
	14 00 18 00	F5 19 FF FF FF FF	00 00 00 00	6J.	
DS:0040 05 00 (	00 00 00 00	00 00 00 00 00	0 00 00 00 00		





#### 2: **SWAP**:

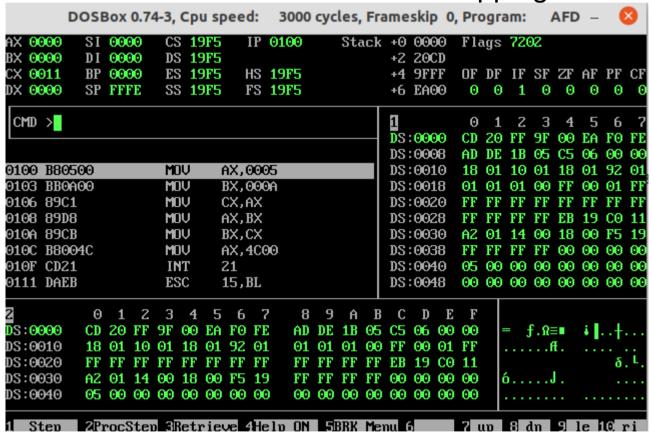
Here will swap the two variables by using the simple concept of using the third variable. Have a look on the code of Swapping.

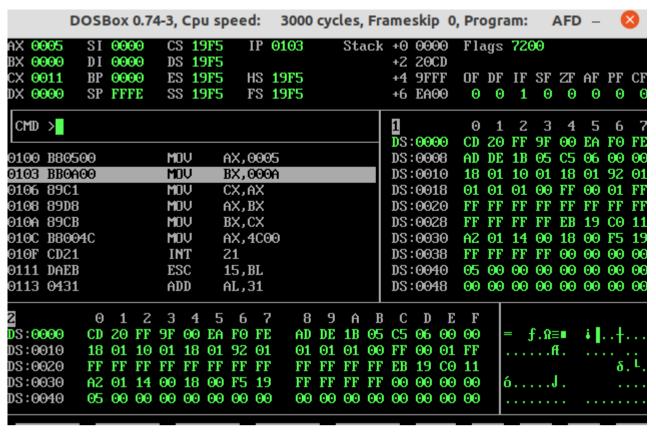
## Code:

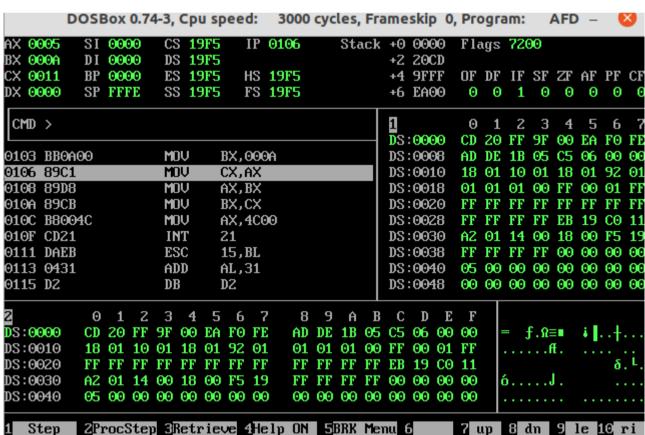
[org 0x010000] mov ax, 5 mov bx, 10 mov cx, ax mov ax, bx mov bx, cx mov ax, 0x4c00 int 0x21

# **Execution Of Swapping:**

Have a look on the execution of swapping code.





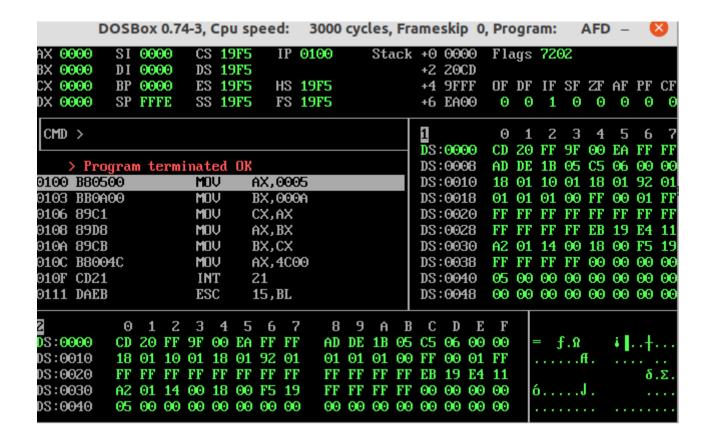


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BX 000A		00				9F5			4 OPE					200		OF	D.E.		OF	- 20	AF	DE	O.F.
CX 0005 DX 0000		OO FFI				9F5 9F5			19F5 19F5					9FI EAC		ur 0			SF 6				
DV 0000	- 31	FF				Jr J			1010			_		ЕП									
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<b>0106 89</b> 01					ΟV	(	CX,1	ΑX						:000					05				
9108 89D8					DV		AX,]							:00:					01				
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9115 D2	•			Di			D2	J.						:00					00				
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DS:0020						$\mathbf{F}\mathbf{F}$					FF						_					δ	, L,
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X 000A	SI				19				010A					000			gs			9	le	110	ri
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14A6 CB				RI	EΤ	]	ar						DS	:003	30	ΑZ	01	14	90	18	00	F5	19
14A7 51				Pl	JSH	(	X						DS	:003	38	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	90	99	90	00
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14A4 000	CF			ΑI			3H,C	L						002							19		
14A6 CB				RI			ar							003		A2		14		18			
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1464 000				ΑI			3H,(							: 002		$\mathbf{F}\mathbf{F}$							
14A6 CB				RI			ar							:002		$\mathbf{F}\mathbf{F}$	FF	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	EB	19	C0	11
14A7 51					JSH	(	X						DS	:00:	30	ΑZ	01	14	00	18	00	F5	19
14A8 B94				MC	)V	(	X,6	)14	Θ				DS	:00:	38	$\mathbf{F}\mathbf{F}$	FF	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	00	00	00	00
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14AD 59				PO	)P	(	CX						DS	:004	18	00	00	00	00	00	00	00	00
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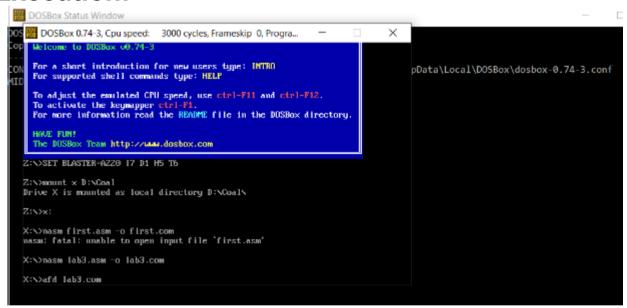
Square of six by adding six to the accumulator six times:

# Code:

### Have a look on a code:

```
[org 0x0100];
mov ax, 6;
add ax, 6;
int 0x21; interept
```

### **Execution:**



		000 000			S 19			IP 6	115		Sta	ack		000 200		Flo	ags	72	14				
CX 0017	BP	000 FFI	90	E	S 19	9F5		HS 1 FS 1					+4		FF	0F 0	DF O	IF 1	SF 0	ZF 0	AF 1	PF 1	CF O
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9112 B80040	0				)U			4C00					DS	:00	98	AD 18	DE O1	1B 10	05	C5	<b>96</b>	00	00
9115 CD21 9117 C08950	5E4	189		R	NT DR	1		E456	+BX+1	ΙIO	,89		DS	:00	18	01	01	01	00	18 02	FF	92 FF	FF
911C 46 911D E6C7				Ol	NC JT			],AL				1	DS	:000	28	FF FF	FF FF	FF FF	FF FF	FF EB		FF CO	FF 11
911F 46 9120 F6000					NC EST		SI EBX:	+811	,00			1		:000 :000		AZ FF	01 FF	14 FF	00 FF			F5 00	19 00
9123 8B46F0 9126 D1E0	6				OV HL		ΑΧ,:	[BP- 1	0A]					:00 :00		05 00					00 00		
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	FF AZ	FF <b>01</b>	FF 14	FF 00	FF 18	FF 00	FF F5	FF 19	FF FF	FF FF	FF FF	FF FF	EB 00	19 00	C0 00	11 00		<b>6.</b> .		J.		δ.	. L.
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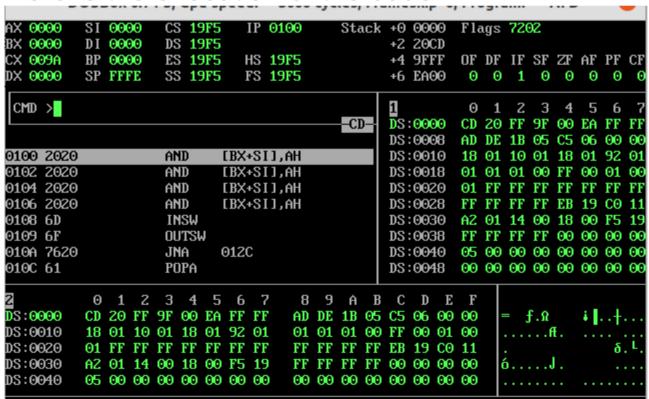
Now we will use the for loop in assembly language. This loop is same loop which we have used in the programming languages. Have a look on the code of it.

### Code:

mov ax,1 loop1 nop cmp ax,1 je loop1

# **Execution:**

Here is the execution of the code:



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AX 0000 BX 0000		00 00				9F5 9F5		IP (	9102		St	ack		000 200		Fla	ags	724	14				
CX 009A		00				9F5	ŀ	dS 1	19F5					9FI		OF	DF	IF	SF	ΖF	ΑF	PF	CF
DX 0000	SF	FF	FE	S	3 1	9F5	1	rs 1	19F5				+6	EA0	90	0	0	1	0	1	0	1	0
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0104 202	20			Al	<b>TP</b>		[BX-	·SI:	I,AH			-I	DS	: 001	L8	01	01	01	99	$\mathbf{F}\mathbf{F}$	00	01	<b>00</b>
0106 Z0X	20			Αt	<b>TP</b>		[BX-	·SI:	l,AH				DS	: 002	20	01	$\mathbf{F}\mathbf{F}$						
0108 GD				ΙÌ	WZP								DS	:002	28	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	EB	19	CO	11
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<u> </u>											-0	<b>Э</b> —		00	90	00	20	$\mathbf{F}\mathbf{F}$	9F	00	ΕA	$\mathbf{F}\mathbf{F}$	FF
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0104 202					٩D				],AH					:00		18	01	10	01	18	01	92	01
0106 Z02	20			Αt	dr.		[BX-	+S I	],AH				DS	:00	18	01	01	01	99	$\mathbf{F}\mathbf{F}$	90	01	00
0108 6D				I	wzr								DS	:00	20	01	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	FF
0109 6F				Ol	JTSI	J.							DS	:00	28	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	EΒ	19	C0	11
010A 762	20			Ji	ΑĤ	- (	9120						DS	:00	30	AZ	01	14	00	18	00	F5	19
010C 61				PO	)PA								DS	:00	38	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	00	99	99	00
010D 782	2C			JS	3	- (	9131	В					DS	:00	40	05	00	-00	00	00	00	00	00
010F 310	9A			X	DR		[BP-	+SI	1,CX				DS	:00	48	<b>90</b>	00	90	00	00	00	00	00
2	0	1	2	3	4	5	6	7	8	9	A	В	С	D	Е	F	П						
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DS:0030	AZ	01	14	$\Theta\Theta$	18	00	F5	19	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	<b>00</b>	00	99	00		ó.,		J.			
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010C 61				PC	JPΑ								DS	:000	28	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	EΒ	19	CO	11
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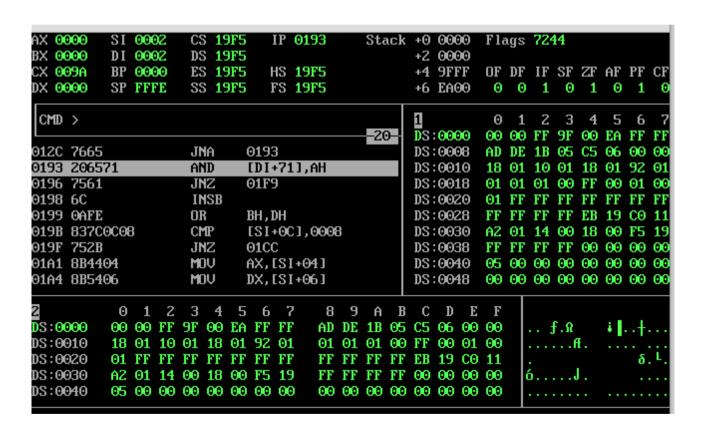
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9112 6F					JTSI									:003		$\mathbf{F}\mathbf{F}$		$\mathbf{F}\mathbf{F}$					
9113 6F					JTSI									:004				<b>00</b>					
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DS:0	9010	18	01	10	01	18	01	92	01	01	01	01	00	$\mathbf{F}\mathbf{F}$	00	01	00			1	Ŧ.			
DS:0	9020	01	$\mathbf{F}\mathbf{F}$	$\mathbf{E}\mathbf{B}$	19	CO	11						δ	. ե.										
DS:0	9030	AZ	01	14	<b>00</b>	18	<b>00</b>	F5	19	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	90	$\Theta\Theta$	<b>00</b>	<b>00</b>		ó.,		J.			
DS:0	9040	05	00	<b>00</b>	<b>00</b>	00	00	$\Theta\Theta$	00	00	00	00	00	99	00	00	00							
DS:0 DS:0	9010 9020 9030	18 01 A2	01 FF 01	10 FF 14	01 FF 00	18 FF 18	01 FF 00	92 FF F5	01 FF 19	O1 FF FF	01 FF FF	O1 FF FF	00 FF FF	FF EB 00	00 19 00	01 C0 00	00 11 00						δ	



DO300X 0.7	+-J, Cpu speed.	Jood Cycles, 11	dilleskip o, F	rogram. /	- U
AX 0000 SI 000Z	CS 19F5 IP	0196 Stack	+0 0000 F	lags 7244	
BX 0000 DI 0002	DS 19F5		+2 0000		
CX 009A BP 0000		19F5			ZF AF PF CF
DX 0000 SP FFFE	SS 19F5 FS	19F5	+6 EA00	9 0 1 0	1 0 1 0
CMD >			1	9 1 2 3	4 5 6 7
				9 00 FF 9F	
0193 206571	AND [DI+71	L],AH	DS:0008 A	D DE 1B 05	C5 06 00 00
0196 7561	JNZ 01F9		DS:0010 1	8 01 10 01	18 01 92 01
0198 6C	INSB				FF 00 01 00
0199 OAFE	OR BH,DH				FF FF FF FF
019B 837C0C08		21,0008			EB 19 CO 11
019F 752B	JNZ 01CC				18 00 F5 19
01A1 8B4404	MOV AX,[S]				00 00 00 00
01A4 8B5406	MOV DX,[S]				00 00 00 00
01A7 BB9F46	MOV BX,469	9F ∣	DS:0048 0	9 99 99 99	00 00 00 00
2 0 1 2	3 4 5 6 7	7 8 9 A B	CDE	F	
DS:0000 00 00 FF			C5 06 00 0	9 f.Ω	i   <del> </del>
	01 18 01 92 01				
DS:0020 01 FF FF	FF FF FF FF FI	FF FF FF FF	EB 19 CO 1	1 .	δ. <sup>L</sup> .
DS:0030 A2 01 14	00 18 00 F5 19	FF FF FF FF	00 00 00 0	9 <b>6</b>	
DS:0040 05 00 00	00 00 00 00 00	00 00 00 00	0 00 00 00	9	

			<b>D</b>	,,,	, U,	0.7	<del>-</del> -5,	Cþ	u sp	,	u.	5000	, cy		c 3,			3KII	, ,	FI	ogii	a		~ · ·	, –	•	•
ΑX	00	000		SI	000	92	C	3 19	F5		ΙP	0196		5	Sta	ck	+0	000	90	Fla	ags	72	44				
ВX					000		DS	3 19	9F5								+2	000	90								
CX	<b>0</b> 0	)9A		ВP	000	90	E	3 19	9F5			19F5						9FI		$\mathbf{OF}$	DF	$\mathbf{IF}$	SF	ZF	ΑF	$\mathbf{PF}$	CF
DΧ	<b>0</b> 0	000		SP	FFI	ЭE	S	3 19	9F5	]	FS	19F5					+6	EA(	90	0	0	1	0	1	0	1	0
	D D	>														Т	1			0	1	2	3	4	5	6	7
Ľ		<u></u>														_		000	90	00	00	FF	9F	00	EΑ	FF	FF
019	93	206	557	'1			Al	ND.		[DI	+71	1,AH						:000		ΑD	DE	1B	05	-	96	00	
019				Ē				YZ		91F								:00:		18	01	10	01	18	01	92	
019	18	6C						<b>ISB</b>			_					-1		:00:		01	01	01	00	$\mathbf{F}\mathbf{F}$	99	01	00
019	99	0AI	FΕ				01	R	]	BH , 1	DH						DS	: 000	20	01	$\mathbf{F}\mathbf{F}$						
019	βB	837	7C0	COE	3		CI	<b>T</b> P		[SI	+00	1,000	<b>18</b>				DS	:000	28	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	EB	19	CO	11
019	θF	752	2B				JI	ΥZ	- 1	91C	C						DS	:00:	30	A2	01	14	99	18	99	F5	19
01£	11	8B4	140	14			M	)V	- 1	ΑX,	[SI	+04]					DS	:00:	38	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	<b>00</b>	<b>00</b>	00	90
		8B5						)V	]	DX,	[SI	+061					DS	:004	<del>1</del> 0	05	99	99	$\Theta\Theta$	90	90	$\Theta\Theta$	00
01£	17	BB9	3F4	6			M	JŲ	]	BX,	469	F				1	DS	:004	<del>1</del> 8	<b>00</b>	<b>00</b>	<b>00</b>	00	<b>00</b>	<b>00</b>	<b>00</b>	90
2				0	1	2	3	4	5	6	7	£	} !	 9	A	В	С	D	E	F	Т						
DS:	00	000		00	00	$\mathbf{F}\mathbf{F}$	9F	00	ΕA	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	ΑI	DI	E 1	1B	05	C5	<b>06</b>	00	00		;	f.n		ΑI	+	
DS :	00	10		18	01	10	01	18	01	92	01	01	0:	1 (	91	00	$\mathbf{F}\mathbf{F}$	00	01	00				Æ.		'	
DS :	00	20		01	FF	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	FF	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	FI	F	P I	PF	FF	EB	19	CO	11						δ	, L,
DS :	00	)30		ΑZ	01	14	99	18	00	F5	19	FF	F	F	FF	FF	00	$\Theta\Theta$	00	00	i li	ó.,		J.			
DS:	00	40		05	$\Theta\Theta$	00	00	00	$\Theta\Theta$	00	00	00	0	0 (	90	00	00	00	$\Theta\Theta$	<b>00</b>							

AX 0000 BX 0000		000			3 19 3 19			IP 6	198		Sta	ack		000		Fla	ags	72	44				
CX 009A		000			3 19		ŀ	4S 1	9F5				+4	9FI		OF	DF	ΙF	SF	ZF	ΑF	PF	CF
DX 0000		FFI			3 19				9F5				+6	EAG	90	0	0	1	0	1	0	1	0
CMD >												Т	1			0	1	2	3	4	5	6	7
												$\dashv$	$\overline{ extbf{D}} extbf{S}$	:000	90	99	99	$\mathbf{F}\mathbf{F}$	9F	99	ΕA	FF	FF
0196 7561					YZ.	(	91F	9						:000		ΑD	DΕ	1B		C5			<b>90</b>
0198 6C				It	<b>YSB</b>									:00:		18	01	10	01	18	01	92	01
0199 OAFE				01		]	BH,1	DH				- 1	DS	:00:	18	01	01	01	90	$\mathbf{F}\mathbf{F}$	00	01	<b>90</b>
019B 837C	OC 06	3			TP		[81-	+0C]	1,0000	3		- 1	DS	:000	20	01	$\mathbf{F}\mathbf{F}$						
019F 752B					YZ.	- (	91C(					- 1	DS	:000	28	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	EB	19	C0	11
01A1 8B44				M	)V	ſ	ΆΧ,I	[814	-04]			- 1	DS	:000	30	ΑZ	01	14	90	18	90	F5	19
01A4 8B54	<b>06</b>			M	)V	]	DX,I	[814	-061			- 1	DS	:000	38	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	99	90	00	00
01A7 BB9F	46			M	)V	]	BX,	169F	•			- 1	DS	:004	40	05	90	90	90	99	90	00	00
01AA 8CD1				M	JV	(	CX,S	38					DS	:004	48	00	00	00	00	00	00	00	00
2	0	1	2	3	4	5	6	7	8	9	A	В	С	D	Е	F							
DS:0000	00	00	$\mathbf{F}\mathbf{F}$	9F	$\Theta\Theta$	ΕA	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	AD	DE	<b>1B</b>	05	C5	<b>06</b>	99	00		;	f.Ω		i I	+.	
DS:0010	18	01	10	01	18	01	92	01	01	01	01	00	$\mathbf{F}\mathbf{F}$	$\Theta\Theta$	01	00			1	Ŧ.			
DS:0020	01	$\mathbf{F}\mathbf{F}$	$\mathbf{E}\mathbf{B}$	19	CO	11						δ	. L.										
DS:0030	AZ	01	14	$\Theta\Theta$	18	$\Theta\Theta$	F5	19	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\Theta\Theta$	$\Theta\Theta$	99	99		ó		J.			
DS:0040	05	00	<b>00</b>	00	00	00	<b>00</b>	<b>90</b>	00	00	00	00	<b>00</b>	<b>00</b>	<b>00</b>	00							

		U	036	υ×	0.7	4-5,	Ch	n sh	CC	u.	3000	cyc	ics,	ги	31116	2KI	υ,	FIL	ygr	31111.	•	чгр	, –	•	
AX (				000			3 19			IP (	0199		Sta	ack	+0	000	90	Flá	ags	724	14				
BX							19									000						_			
CX						_	19				19F5					9F(		OF	DF	IF		ZF		PF	CF
DX (	0.0.0.	U	SP	FFI	Œ	20	3 19	#5	J	12	19F5				+6	EAG	90	Θ	Θ	1	Θ	1	0	1	0
CM	D >	T												Т	1			0	1	2	3	4	5	6	7
														4		:000	90	00	00	00	9F	00	ΕA	$\mathbf{F}\mathbf{F}$	FF
0198	B 6	С				11	<b>ISB</b>							- 1	DS	:000	98	ΑD	DE	<b>1B</b>	05	<b>C5</b>	<b>06</b>	00	00
0199	9 0	AFE				01	}	]	BH , I	DH					DS	:00:	10	18	01	10	01	18	01	92	01
0191	B 8	37C	0C0£	3		Ch	TP		[SI-	+0C]	1,0000	3		_	DS	:00:	18	01	01	01	00	$\mathbf{F}\mathbf{F}$	00	01	00
0191	F 7!	52B					ΥZ	(	91C(	0					DS	:000	20	01	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	FF
<b>01</b> A:	1 8	B44	04			MC	)Ų	f	ΆΧ,I	[814	·04]				DS	:000	28	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	EB	19	CO	11
01A						MC	JV	]	DX,I	[814	<b>⊦</b> 061				DS	:00:	30	ΑZ	01	14	$\Theta\Theta$	18	99	F5	19
01A			46			MC	JV	]	ΒΧ, <b></b>	469I	7				DS	:00:	38	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	90	90	00	00
<b>01</b> Ar						MC	JV		CX,S	38					DS	:00	<del>1</del> 0	05	90	90	$\Theta\Theta$		90	00	00
01A	C 9	A26	OCE?	710		Cŕ	ALL	-	ICE;	7:00	226			- 1	DS	:004	<del>1</del> 8	<b>00</b>	<b>0</b> 0						
2			0	1	2	3	4	5	6	7	8	9	Á	В	С	D	E	F	Т						
DS:	000	9	00	90	00	9F	00	ΕA	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	AD	DE	<b>1B</b>	05	<b>C5</b>	<b>96</b>	00	00		;	f.n		i I	+.	
DS:0	001	9	18	01	10	01	18	01	92	01	01	01	01	00	$\mathbf{F}\mathbf{F}$	00	01	99		`		ŧ.		٠.,	
DS : 0	002	9	01	$\mathbf{F}\mathbf{F}$	$\mathbf{E}\mathbf{B}$	19	CO	11						δ.	. L.										
DS : 0	003	9	AZ	01	14	$\Theta\Theta$	18	00	F5	19	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\Theta\Theta$	00	$\Theta\Theta$	00		ó		١.			
DS : 0	004	9	05	00	00	$\Theta\Theta$	00	00	00	$\Theta\Theta$	00	00	<b>00</b>	00	00	$\Theta\Theta$	$\Theta\Theta$	00	_						

0198 6C         INSB         DS:0008         AD DE 1B 05 C5 06 00           0199 0AFE         OR         BH,DH         DS:0010         18 01 10 01 18 01 92           019B 837C0C08         CMP         [SI+0C],0008         DS:0010         18 01 10 01 18 01 92           019F 752B         JNZ         01CC         DS:0020         01 FF		ונטע	DUX	0.7	4-5,	Ch	n sh	,ee	u.	3000	cyc	ies,	, FIG	11116	PINE	ν υ,	FIL	ygre	31111.	- 1	MFL	, –	•	
CX 009A BP 0000 ES 19F5 HS 19F5									IP	0199		Sta	ack				Fla	ags	724	14				
DX 0000   SP FFFE   SS 19F5   FS 19F5   +6 EA00   0   0   1   0   1   0   1																								
CMD >																								CF
DS:0000 00 00 00 9F 00 EA FF	DX 0000	SP	FF	DID.	S	3 19	JF5	ı	fS :	19F5				+6	EA	90	0	0	1	0	1	0	1	0
DS:0000 00 00 00 9F 00 EA FF	CMD >												Т	1			0	1	2	3	4	<u> </u>	6	7
0199 OAFE         OR         BH,DH         DS:0010         18 01 10 01 18 01 92           019B 837C0C08         CMP         [SI+0C],0008         DS:0018         01 01 01 00 FF 00 01           019F 752B         JNZ         01CC         DS:0020         01 FF															00	90	00	00	00	9F	$\Theta\Theta$	ΕA	$\mathbf{F}\mathbf{F}$	FF
019B 837C0C08       CMP       [SI+0C],0008       DS:0018       01 01 01 00 FF 00 01         019F 752B       JNZ       01CC       DS:0020       01 FF	0198 6C				I	<b>YSB</b>								DS	:00	98	ΑD	DE	<b>1B</b>	05	<b>C5</b>	<b>06</b>	00	00
019F 752B       JNZ       01CC       DS:0020       01 FF	0199 OA	FE			01	R	]	BH,I	DH					DS	:00:	10	18	01	10	01	18	01	92	01
01A1 8B4404       MOV AX,[SI+04]       DS:0028 FF FF FF FF EB 19 CO         01A4 8B5406       MOV DX,[SI+06]       DS:0030 A2 01 14 00 18 00 F5         01A7 BB9F46       MOV BX,469F       DS:0038 FF FF FF FF FF 00 00 00 00         01AA 8CD1       MOV CX,SS       DS:0040 05 00 00 00 00 00 00 00         01AC 9A260CE71C       CALL 1CE7:0C26       DS:0048 00 00 00 00 00 00 00 00         2       0 1 2 3 4 5 6 7 8 9 A B C D E F         DS:0000 00 00 00 9F 00 EA FF FF AD DE 1B 05 C5 06 00 00f.Ω      f.Ω         DS:0010 18 01 10 01 18 01 92 01 01 01 01 00 FF 00 01 00ft.      f.Ω         DS:0020 01 FF	019B 83	70000	В		Cl	P		[SI-	+0C	1,0008	3			DS	:00:	18	01	01	01	00	$\mathbf{F}\mathbf{F}$	00	01	00
01A4 8B5406       MOU       DX, [SI+06]       DS:0030       A2 01 14 00 18 00 F5         01A7 BB9F46       MOU       BX, 469F       DS:0038 FF FF FF FF FF 00 00 00 00         01AA 8CD1       MOU       CX, SS       DS:0040 05 00 00 00 00 00 00 00         01AC 9A260CE71C       CALL 1CE7:0C26       DS:0048 00 00 00 00 00 00 00 00         2       0 1 2 3 4 5 6 7 8 9 A B C D E F         DS:0000 00 00 00 9F 00 EA FF FF AD DE 1B 05 C5 06 00 00f.Ω      f.Ω         DS:0010 18 01 10 01 18 01 92 01 01 01 01 00 FF 00 01 00ft.      ft.         DS:0020 01 FF	019F 75	2B			Ji	YZ.	(	91C(						DS	:00	20	01	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	FF
01A7 BB9F46       MOU BX,469F       DS:0038 FF FF FF FF F0 0 00 00 00 00 00 00 00 0	01A1 8B	4404			M	)V	ſ	ΆΧ,I	[SI	+04]				DS	:00	28	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	EB	19	CO	11
01AA 8CD1       MOU CX,SS       DS:0040 05 00 00 00 00 00 00 00 00 00 00 00 00	01A4 8B	5406			M	)V	]	DX,I	[SI	+061				DS	:00	30	AΖ	01	14	99	18	90	F5	19
01AC 9A260CE71C       CALL 1CE7:0C26       DS:0048 00 00 00 00 00 00 00 00         2       0 1 2 3 4 5 6 7 8 9 A B C D E F         DS:0000 00 00 00 9F 00 EA FF FF AD DE 1B 05 C5 06 00 00f.Ω i+         DS:0010 18 01 10 01 18 01 92 01 01 01 00 FF 00 01 00ft.         DS:0020 01 FF							]	BX,4	<b>1</b> 691	F				DS	:00	38	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	99	90	00	00
2 0 1 2 3 4 5 6 7 8 9 A B C D E F DS:0000 00 00 00 9F 00 EA FF FF AD DE 1B 05 C5 06 00 00f.Ω i+ DS:0010 18 01 10 01 18 01 92 01 01 01 00 FF 00 01 00f DS:0020 01 FF EB 19 C0 11 . δ					M	)V								DS	:00	40	05							
DS:0000 00 00 00 9F 00 EA FF FF AD DE 1B 05 C5 06 00 00f.Ω i+ DS:0010 18 01 10 01 18 01 92 01 01 01 00 FF 00 01 00f DS:0020 01 FF δ δ	01AC 9A	260CE	71C		Cf	ìLL		1CE7	7:0	C26			- 1	DS	:00	<del>1</del> 8	<b>00</b>	00						
DS:0010 18 01 10 01 18 01 92 01 01 01 01 00 FF 00 01 00fl DS:0020 01 FF EB 19 C0 11δ	2	0	1	2	3	4	 5	6	7	8	9	A	В	С	D	E	F	Т						
DS:0010 18 01 10 01 18 01 92 01 01 01 01 00 FF 00 01 00fl DS:0020 01 FF EB 19 C0 11δ	DS:0000	99	00	00	9F	00	EΑ	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	AD	DE	<b>1</b> B	05	<b>C5</b>	<b>96</b>	00	00			f.n		i I	+	
	DS:0010	18	01	10	01	18	01	92	01	01	01	01	00	$\mathbf{F}\mathbf{F}$	00	01	00						'	
DS:0030 A2 01 14 00 18 00 F5 19 FF FF FF FF 00 00 00 00 6J	DS:0020	01	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	FF	FF	$\mathbf{F}\mathbf{F}$	FF	FF	FF	$\mathbf{F}\mathbf{F}$	FF	EB	19	CO	11						δ	١.
	DS:0030	AZ	01	14	00	18	00	<b>F</b> 5	19	$\mathbf{F}\mathbf{F}$	FF	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	00	00	00	00	l	ó		J.			
DS:0040 05 00 00 00 00 00 00 00 00 00 00 00 00	DS:0040	05	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00							

	-,		,	,	
AX 0000 SI 0002	CS 19F5	IP 019B	Stack +0 0	000 Flags	7244
BX 0000 DI 0003	DS 19F5		+2 0	000	
CX 009A BP 0000		HS 19F5	+4 9		IF SF ZF AF PF CF
DX 0000 SP FFFE	SS 19F5	FS 19F5	+6 E	A00 0 0	1 0 1 0 1 0
CMD >			1	0 1	2 3 4 5 6 7
			DS:0	00 00 00	00 9F 00 EA FF FF
0199 OAFE	OR BH,	DH	DS:0	0008 AD DE	1B 05 C5 06 00 00
019B 837C0C08	CMP [SI	+0C1,0008	DS:0	010 18 01	10 01 18 01 92 01
019F 752B	JNZ 01C	С	DS:0	018 01 01	01 00 FF 00 01 00
01A1 8B4404	MOV AX,	[SI+04]	DS:0	020 01 FF	FF FF FF FF FF
01A4 8B5406	MOV DX,	[SI+06]	DS:0	1028 FF FF	FF FF EB 19 CO 11
01A7 BB9F46	MOV BX,	469F	DS:0	1030 AZ 01	14 00 18 00 F5 19
01AA 8CD1	MOV CX,	SS	DS:0		FF FF 00 00 00 00
01AC 9A260CE71C	CALL 1CE	7:0026	DS:0		00 00 00 00 00 00
01B1 85C0	TEST AX,	AX	DS:0	048 00 00	00 00 00 00 00 00
<b>2</b> 0 1 2	3 4 5 6	7 8 9	A B C	D E F	
	9F 00 EA FF				f.Ω <b>↓</b>  +
	01 18 01 92			0 01 00	f.
DS:0020 01 FF FF	FF FF FF FF	FF FF FF	FF FF EB 1	9 CO 11	δ.L.
DS:0030 A2 01 14	00 18 00 F5	19 FF FF	FF FF 00 0	0 00 00 á	J
DS:0040 05 00 00	00 00 00 00	00 00 00	00 00 00 0	0 00 00 .	

					,						-,							- 5					•	
AX O	900	SI	000	92	CS	3 19	9F5		IP (	919B		$\mathbf{St}_{i}$	ack		000		Fla	ags	72	14				
BX 🛈			000		DS	3 19	9F5							+2	000	90								
CX O	09A	BP	000	90			9F5	ŀ	HS :	19F5					9F(		$\mathbf{OF}$	DF	$\mathbf{IF}$	SF	ZF	ΑF		
DX 0	900	SP	FFI	e le	S	3 19	9F5	]	FS :	19F5				+6	EAG	90	0	Θ	1	0	1	0	1	Θ
CMD	>												Т	1			0	1	z	3	4	5	6	7
╙											—≣	000	э <del>-</del> Н		:000	90	$\Theta\Theta$			9F	00	ΕA	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$
0199	0AI	FE			01	R	1	3H,1	DH		-		_	DS	:000	98	AD	DE	<b>1B</b>	05	<b>C5</b>	<b>06</b>	$\Theta\Theta$	00
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