



中显液晶
技术资料



型号: ZX12232A

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目 录

(一) 基本特性	(1)
(二) 原理图	(2)
(三) 限定参数	(2)
(四) 直流特性	(2)
(五) 交流特性	(3)
(六) 引脚特性	(3)
(七) 指令表	(4)
(八) DDRAM 地址表	(5)
(九) 应用举例	(5)

一. 基本特征

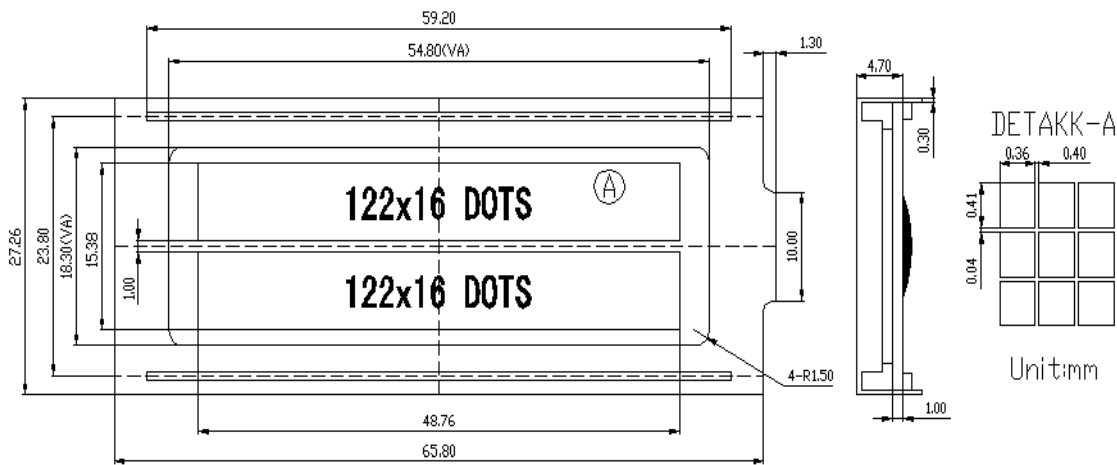
1. 概述

ZX12232A 是一种图形点阵液晶显示器,它主要由行驱动器/列驱动器及 122×32 全点阵液晶显示器组成。可完成图形显示,也可以显示七个半(16×16 点阵)汉字。具有分屏和不分屏两种,购买时可以任意选择,使用说明是一样的。

主要技术参数和性能:

- 1. 电源: VDD=+2.7V~+5V; LCD 外接驱动电压 VDD-V0=5.0V。
- 2. 显示内容: 122(列)×32(行)点
- 3. 显示颜色: 绿底兰字
- 4. 显示角度: 6 点钟直视
- 5. STN 正视反射模式
- 6. 驱动方式: 1/32 Duty, 1/6 Bias
- 7. 工作温度: -20℃~+60℃, 存储温度: -30℃~+70℃
- 8. 连接方式: 外部接口由扁平带缆连接

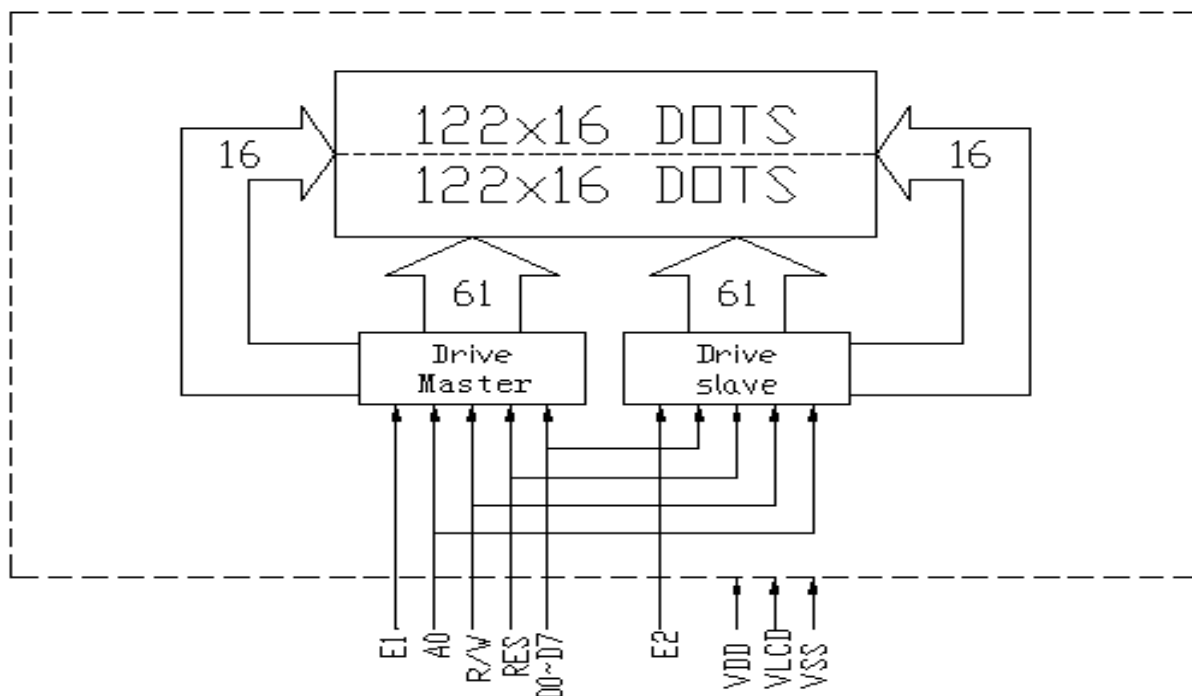
2. 外形尺寸图



3. 机械尺寸一览:

项目	标准尺寸	单位
模块体积	67.1×27.2×8.4	mm
视域	54.8×18.3	mm
行列点阵数	122×32	dots
点距离	0.40×0.45	mm
点大小	0.36×0.41	mm

二. 原理图:



三. 限定参数

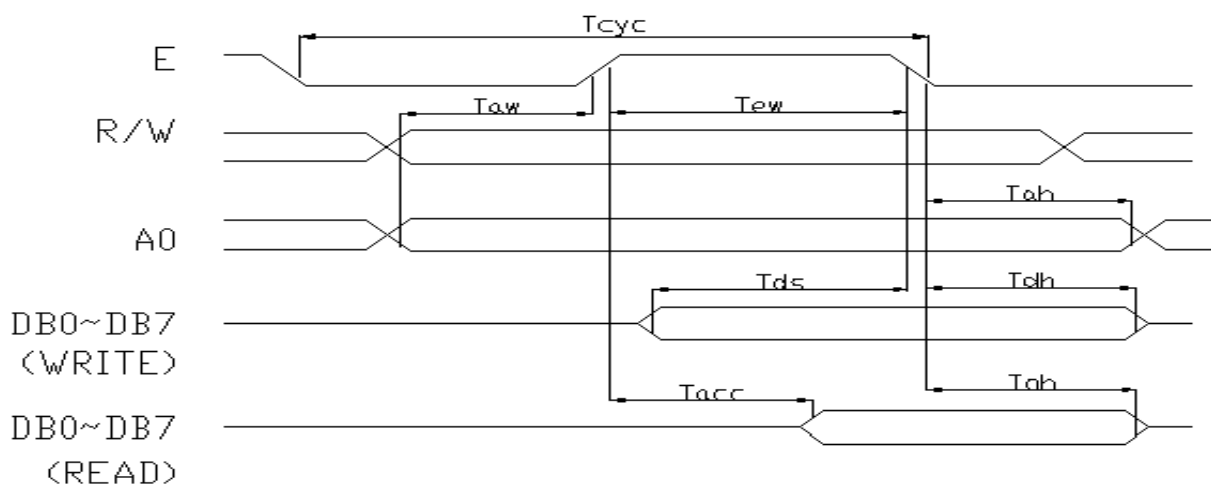
Item	SZXbol	Standard Value	Unit	Condition
Power supply voltage	VDD	0~+7.0	V	
LCD driving voltage	VDD~VLCD	+3.5~+12.0		
Input voltage	VIN	$GND \leq V_{IN} \leq V_{DD}$		
Operating temperature range	Top	-20~+60	℃	No condition
Storage temperature range	Tst	-30~+70		

四. 直流特性: (Ta=0~40℃, VDD=2.7~6.0V)

Item	SZXbol	Standard Value	Unit
Power Supply	VDD	+2.4 ~ +6.0	V
LCD Driving Voltage	VLCD	-----	V
Input High Voltage	VIN	$0.8V_{DD} \leq V_{IN} \leq V_{DD}$	V
Output High Voltage	VOH	$0.5V_{DDmin}$	V
Input Low Voltage	VIL	$0 \leq V_{IL} \leq 0.2V_{DD}$	V
Output Low Voltage	VOL	$0.1V_{DDmax}$	V
Power Supply Current	IDD	2max	mA
LCD Power Supply Current	ILCD	220max	uA

五. 交流特性

Signal	Parameter	SZXbol	MIN	MAX	Unit	Condition
A0, /RW	System cycle time	Tcyc	2000	--	ns	
	Address setup time	Taw	40	--	ns	
	Address hold time	Tah	20	--	ns	
D0~D7	Data setup time	Tds	160	--		CL=100p F
	Data hold time	Tdh	20	--	ns	
	Output disable time	Tch	20	120	ns	
	Access time	Tacc	--	180	ns	
E	Enable pulse width(Read)	Tew	200	--		
	Enable pulse width(Write)		160	--	ns	
Input wave width rise time		Tr	--	15	ns	



六. 引脚特性

管脚号	管脚名称	LEVER	管脚功能描述
1	VDD	+5.0V	电源电压
2	VSS	0	电源地
3	V0	0~+5V	对比度调节参考电压输入端
4	/RET	H/L	复位信号。在系统需要硬件复位时，在/RES端产生一个上升沿信号。当内部电路复位后，/RES端保持高电平。
5	E1	H/L	读写使能信号(MASTER)
6	E2	H/L	读写使能信号(SLAVE)
7	R/W	H/L	读写选择信号
8	D/I	H/L	D/I= "H", 表示 DB7~DB0 为显示数据 D/I= "L", 表示 DB7~DB0 为显示指令数据
9	DB0	H/L	数据线
10	DB1	H/L	数据线
11	DB2	H/L	数据线
12	DB3	H/L	数据线
13	DB4	H/L	数据线

14	DB5	H/L	数据线
15	DB6	H/L	数据线
16	DB7	H/L	数据线
17	A	+5V	背光正极（可用开关电路控制背光开与关）
18	K	GND	背光地

注：）当 VDD=+3V 时，V0=0~+5V（可用电位器调节取样，确定对比度）

七. 指令表

INSTRCTI ON	CODE										FUNCTION
	R/W	D/I	D7	D6	D5	D4	D3	D2	D1	D0	
DISPLAY ON/OFF	0	0	1	0	1	0	1	1	1	1/0	Switch the entire display ON or OFF, regardless of the display RAM's Data or the internal status. 1: ON 0: OFF
Display Start Line	0	0	1	1	0	Display start Line (0 •••• 31)					Determines the line of RAM data to be displayed at the display's top line (COM0)
Page Address set	0	0	1	0	1	1	1	0	PAGE: (0~3)		Sets the page of the Display in the Address register(X address)
Column (seg) Address set	0	0	0	Column address(0~79)							Sets the column of the Display in the column address register(Y address)
Status Read	1	0	B u s y	A D C	ON / OFF	R S T	0	0	0	0	Read status Busy 1:internal operation 0:Ready ADC 1:Rightward output 0:Leftward RST 1:Reseting 0:Normal ON/OFF 1:Display on 0:Display off
Write Display Data	0	1	Write data								Writes the data on the Data bus to RAM
Read Display Data	1	1	Read data								Reads data from the Display RAM onto the Data BUS
ADC Select	0	0	1	0	1	0	0	0	0	0/1	Determine the clockwise or Counterclockwise reading of the display Data RAM 0: Clockwise 1: Counterclockwise
Static Drive ON/OFF	0	0	1	0	1	0	0	1	0	0/1	Select the dynamic or static Driving. 1:Static driving 0: Dynamic driving
Duty Ratio	0	0	1	0	1	0	1	0	0	0/1	Select the duty ratio

Select											1:1/32 duty 0:1/16 duty
Read Modify Write	0	0	1	1	1	0	0	0	0	0	Increment the column Address register when writing. But no-change when reading.
End	0	0	1	1	1	0	1	1	1	0	Release from the Read Modify Write Mode.
Reset	0	0	1	1	1	0	0	0	1	1	Set the Display Start Line Register to 1 st line, column Address count to 0 and Page Add. Resister to 0.
Power Save(dualco mmand)	0 0	0 0	0 0	1 1	0 0	1 1	0 0	1 1	1 0	0 1	Set the power save mode by selecting display off and static driving on

八. DDRAM 地址表

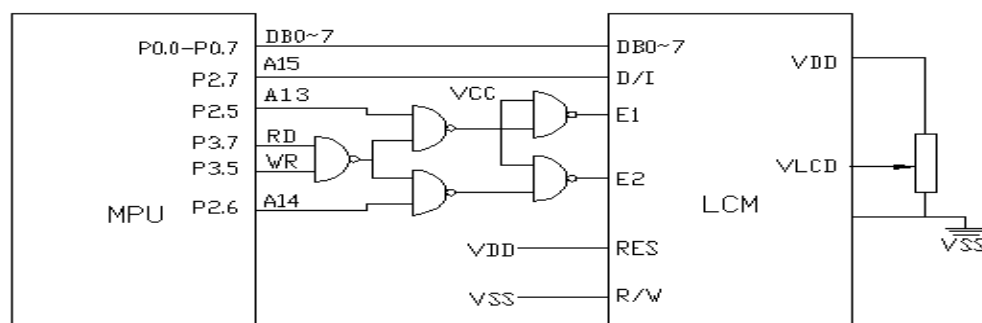
Page	Data		Com No	Drive
2	D0	:	1 : : 16	Slave
	:	:		
3	D7	122 X 16 PLXELS		
	:	:		
0	D0	:	17 : : 32	Master
	:	:		
1	D7	122 X 16 PLXELS		
	:	:		
Column Addr		ADC=0	00H 3C	00H 3C
		Seg No	0 60	0 60
		Drive	Slave	Master

九. 应用举例

ZX12232A 有(1)直接访问方式和(2)间接控制方式两种

ZX12232A 与单片机 8031 的直接访问接口如图 5 所示: (VDD=+5V)

ZX12232A 与单片机 8031 的直接访问接口如图 6 所示：(VDD=+5V)



利用图 5 举例介绍编程实例

```

    ORG 0100H
INITM: MOV A, #0E2H          ; RESET
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #0AEH        ; OFF DISPLAY
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #0A4H        ; OFF STATIC DRIVE
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #0A9H        ; SELECT 1/32 DUTY
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #0A0H        ; ADC SELECT RIGHTWARS OUTPUT
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #0EEH        ; READ MODIFY WRITE OFF
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #00H         ; COLUMN ADDRESS SET
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #0C0H        ; SET DISPLAY START LINE
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #0AFH        ; ON DISPLAY
        LCALL OUTMI
        LCALL OUTSI
; DISPLAY "*"
        MOV R2, #0B8H

```

```
DIS2: MOV  A, R2
      LCALL OUTMI
      LCALL OUTSI
      MOV  A, #00H
      LCALL OUTMI
      LCALL OUTSI
      MOV  R1, #1FH
DIS1: MOV  A, #55H
      LCALL OUTMI
      LCALL OUTSI
      MOV  A, #0AAH
      LCALL OUTMI
      LCALL OUTSI
      DJNZ R1, DIS1
      INC  R2
      CJNE R2, #0BCH, DIS2
      LCALL MS40
      LCALL MS40
      LCALL MS40
      LCALL MS40
      MOV  A, #0AFH
; DISPLAY “横条”
      MOV  R2, #0B8H
DIS3: MOV  A, R2
      LCALL OUTMI
      LCALL OUTSI
      MOV  A, #00H
      LCALL OUTMI
      LCALL OUTSI
      MOV  R1, #3DH
DIS4: MOV  A, #55H
      LCALL OUTMD
      LCALL OUTSD
      DJNZ R1 , DIS4
      INC  R2
      CJIE R2, #0BCH, DIS3
      LCALL MS40
      LCALL MS40
      LCALL MS40
      LCALL MS40
      MOV  A, #0AFH
      LCALL OUTMI
      LCALL OUTSI
```

; DISPLAY “竖条”

```
        MOV  R2, #0B8H
DIS5:   MOV  A, R2
        LCALL OUTMI
        LCALL OUTSI
        MOV  A, #00H
        LCALL OUTMI
        LCALL OUTSI
        MOV  R1, #1EH
DIS6:   MOV  A, #00H
        LCALL OUTMI
        LCALL OUTSI
        MOV  A, #0FFH
        LCALL OUTMI
        LCALL OUTSI
        DJNZ R1, DIS6
        MOV  A, #3CH
        LCALL OUTMI
        LCALL OUTSI
        MOV  A, #00H
        LCALL OUTMI
        LCALL OUTSI
        INC  R2
        CJNE R2, #0BCH, DIS5
        LCALL MS40
        LCALL MS40
        LCALL MS40
        LCALL MS40
        MOV  A, #0AFH
```

; DISPLAY 汉字 “两只黄鹂鸣翠柳 一行白鹭上青天”

```
INITMC: MOV  DPTR, #CHINESE
        MOV  R1, #00H
        MOV  B, #B8H
DISPWORDM: PUSH B
        MOV  A, B
        LCALL OUTMI
        LCALL OUTST
        MOV  A, #00H
        LCALL OUTMI
        MOV  R2, #7AH
DISPWORD1: MOV  A, R1
        MOVC A, @A+DPTR
        LCALL OUTMD
```

```
    INC DPTR
    DEC R2
    CJNE R2, #3DH, DISPWORD1
    MOV A, #00H
    LCALL OUTST
DISPWORD2: MOV A, R1
    MOVC A, @A+DPTR
    LCALL OUTSD
    INC DPTR
    DJNZ R2, DISPWORD2

    MOV R1, #00H
    POP B
    INC B
    MOV A, B
    CINZ A, #0BCH, DISPWORDM
    LCALL MS40
    LCALL MS40
    LCALL MS40
    LCALL MS40

    AJMP INITM

MS40: MOV R7, #0E8H
MS2:  MOV R6, #0FFH
MS1:  DJNA R6, MS1
      DJNZ R7, MS2
      RET

; OUT INSTRUCTION TO MASTER 6450
OUTMI: PUSH DPH
      PUSH DPL
      MOV DPTR, #6000H
      MOVX @DPTR, A
      POP DPL
      POP DPH
      RET

; OUT INSTRUCTION TO SLAVE 6450
OUTSI: PUSH DPH
      PUSH DPL
      MOV DPTR, #5000H
      MOVX @DPTR, A
      POP DPL
```

```
POP DPH
RET
```

```
; OUT DATA TO MASTER 6450
```

```
OUTMD: PUSH DPH
        PUSH DPL
        MOV DPTR, #0E000H
        MOVX @DPTR, A
        POP DPL
        POP DPH
        RET
```

```
; OUT DATA TO SLAVE 6450
```

```
OUTSD: PUSH DPH
        PUSH DPL
        MOV DPTR, #0D000H
        MOVX @DPTR, A
        POP DPL
        POP DPH
        RET
```

```
CHINESE:: (PAGE0)
```

```
DB 00H, 00H
DB 00H, 80H, 80H, 80H, 80H, 80H, 80H, 80H, 80H, 80H, 80H, 80H, 80H, 80H, 0COH, 80H, 00
DB 00, 00, 10H, 88H, 0C4H, 23H, 40H, 42H, 42H, 42H, 42H, 42H, 0C2H, 43H, 62H, 40H, 00
DB 00, 00, 00, 0F8H, 08H, 0CH, 0AH, 09H, 08H, 08H, 08H, 08H, 08H, 0FCH, 08H, 00, 00
DB 00, 80H, 0EEH, 8AH, 0FAH, 0AAH, 0AEH, 80H, 24H, 0E3H, 0B6H, 0AAH, 0B6H, 0E2H, 20H, 20H, 00
DB 00, 00, 00, 00, 00, 00, 00, 00, 0FFH, 20H, 20H, 20H, 30H, 20H, 00, 00, 00
DB 00, 40H, 44H, 54H, 54H, 54H, 54H, 54H, 7FH, 54H, 54H, 54H, 54H, 56H, 44H, 40H, 00
DB 00, 40H, 42H, 42H, 42H, 42H, 42H, 42H, 0FEH, 42H, 42H, 42H, 42H, 43H, 62H, 40H, 00
DB 00
```

```
; (PAGE1)
```

```
DB 00, 00
DB 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00
DB 00, 02H, 01H, 00, 0FFH, 00, 00, 00, 00, 00, 40H, 80H, 7FH, 00, 00, 00, 00
DB 00, 00, 00, 7FH, 21H, 21H, 21H, 21H, 21H, 21H, 21H, 21H, 21H, 7FH, 00, 00, 00
DB 00, 00, 40H, 40H, 5H, 52H, 53H, 56H, 5AH, 52H, 5AH, 56H, 90H, 90H, 78H, 10H, 00
DB 00, 40H, 40H, 40H, 40H, 40H, 40H, 40H, 7FH, 40H, 40H, 40H, 40H, 40H, 60H, 40H, 00
DB 00, 00, 00, 00, 0FFH, 15H, 15H, 15H, 15H, 15H, 55H, 95H, 7FH, 00, 00, 00, 00
DB 00, 80H, 80H, 40H, 20H, 10H, 0CH, 03H, 00, 03H, 0CH, 10H, 20H, 40H, 0COH, 40H, 00
DB 00
```

```
; (PAGE2)
```

```
DB 00, 00
```

DB 00, 02H, 02H, 0F2H, 12H, 12H, 0FEH, 12H, 12H, 12H, 0FEH, 12H, 12H, 0F2H, 03H, 02H, 00
DB 00, 00, 00, 00, 0FCH, 04H, 04H, 04H, 04H, 04H, 04H, 04H, 0FEH, 04H, 00, 00, 00
DB 00, 20H, 20H, 24H, 24H, 24H, 3FH, 24H, 0E4H, 24H, 3FH, 24H, 24H, 24H, 30H, 20H, 00
DB 00, 04H, 0E4H, 24H, 0E4H, 04H, 0E4H, 26H, 0E4H, 00, 0FCH, 06H, 55H, 84H, 7CH, 00, 00
DB 00, 00, 0FCH, 04H, 04H, 0FCH, 04H, 00, 0FCH, 06H, 15H, 44H, 84H, 7EH, 04H, 00, 00
DB 00, 00, 40H, 41H, 55H, 0C9H, 41H, 5FH, 60H, 41H, 55H, 0C9H, 41H, 5FH, 40H, 00, 00
DB 00, 10H, 0D0H, 0FFH, 90H, 10H, 0FEH, 02H, 02H, 0F9H, 00, 0FEH, 02H, 02H, 0FFH, 02H, 00
DB 00

; (PAGE3)

DB 00, 00
DB 00, 00, 00, 0FFH, 08H, 04H, 03H, 14H, 08H, 04H, 03H, 44H, 98H, 7FH, 00, 00, 00
DB 00, 00, 80H, 40H, 23H, 11H, 19H, 01H, 01H, 01H, 09H, 11H, 23H, 60H, 0C0H, 00, 00
DB 00, 00, 80H, 80H, 5FH, 55H, 35H, 15H, 1FH, 15H, 35H, 35H, 5FH, 40H, 80H, 00, 00
DB 00, 00, 7FH, 02H, 7FH, 00, 7FH, 02H, 7FH, 10H, 13H, 12H, 1AH, 52H, 82H, 7EH, 00
DB 00, 00, 0FH, 04H, 04H, 0FH, 10H, 10H, 13H, 12H, 12H, 1AH, 52H, 82, 7FH, 02H, 00
DB 00, 08H, 08H, 0AH, 09H, 08H, 09H, 0AH, 0FCH, 0AH, 09H, 08H, 09H, 0AH, 08H, 08H, 00
DB 00, 01H, 00, 0FFH, 00, 01H, 8FH, 44H, 22H, 1FH, 00, 0FFH, 08H, 10H, 0FH, 00, 00
DB 00

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