



中显液晶
技术资料



型号: ZX12232C

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一. 基本特征

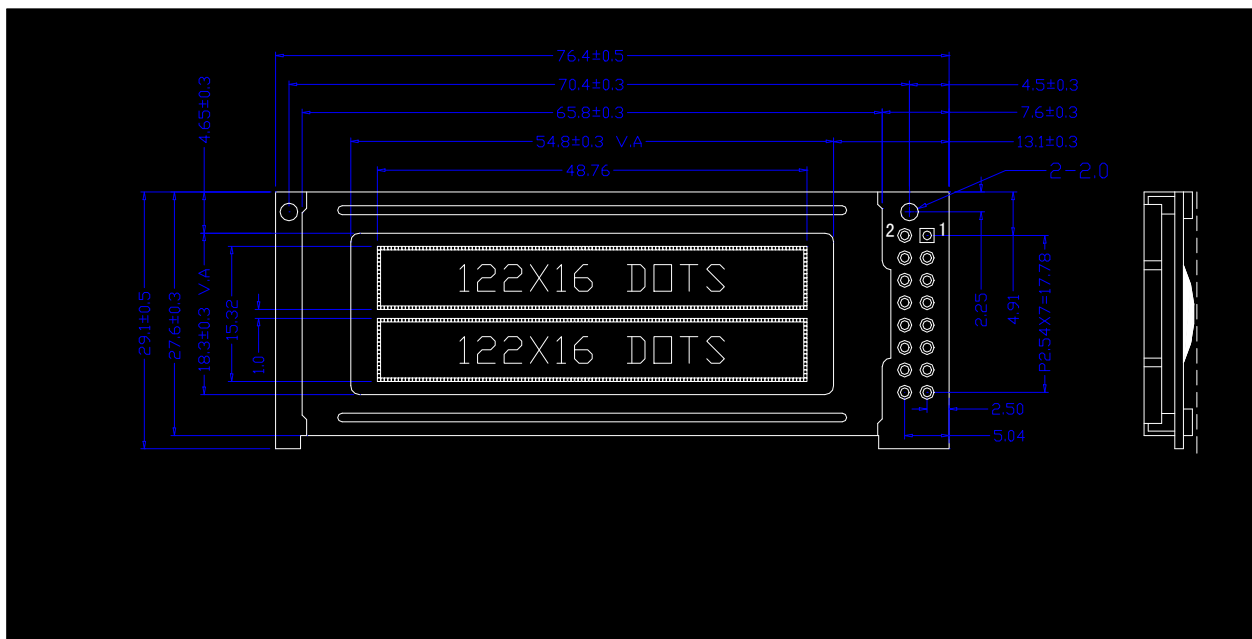
1. 概述

ZX12232C 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。

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: -10℃~+60℃, 存储温度: -20℃~+70℃
8. 连接方式: 外部接口由插针连接

2. 外形尺寸图

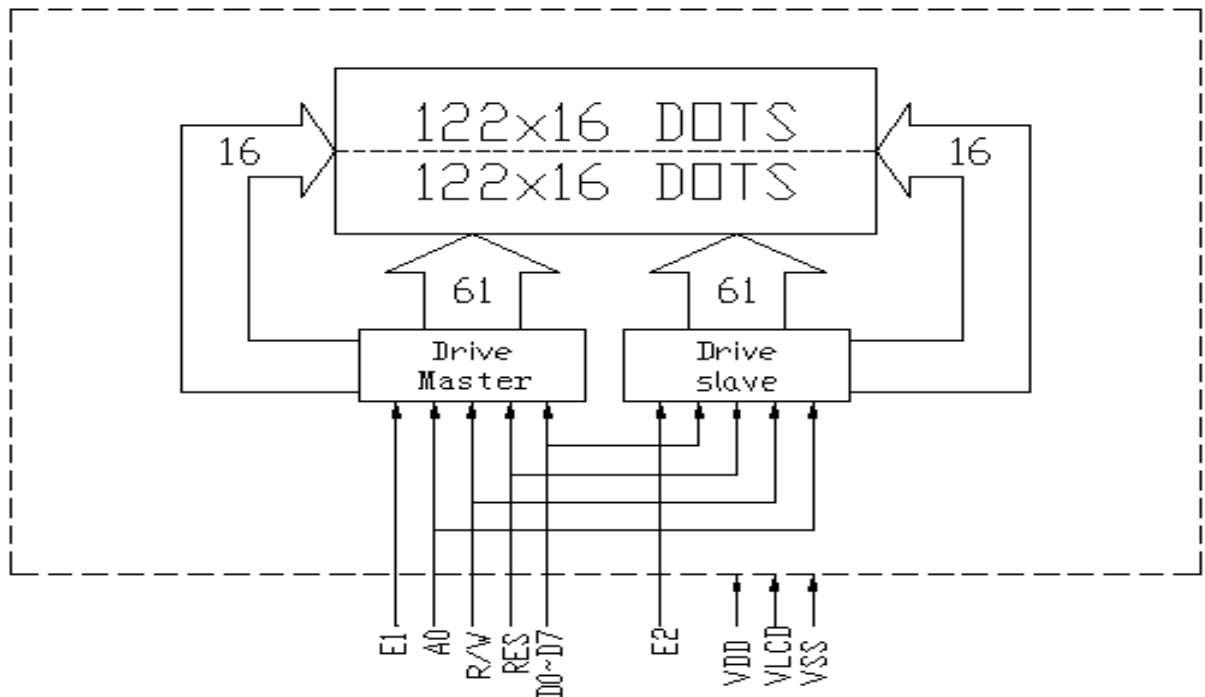


3. 机械尺寸一览:

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	Symbol	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≤VIN≤VDD		
Operating temperature range	Top	-20~+60	℃	No condition
Storage temperature range	Tst	-30~+70		

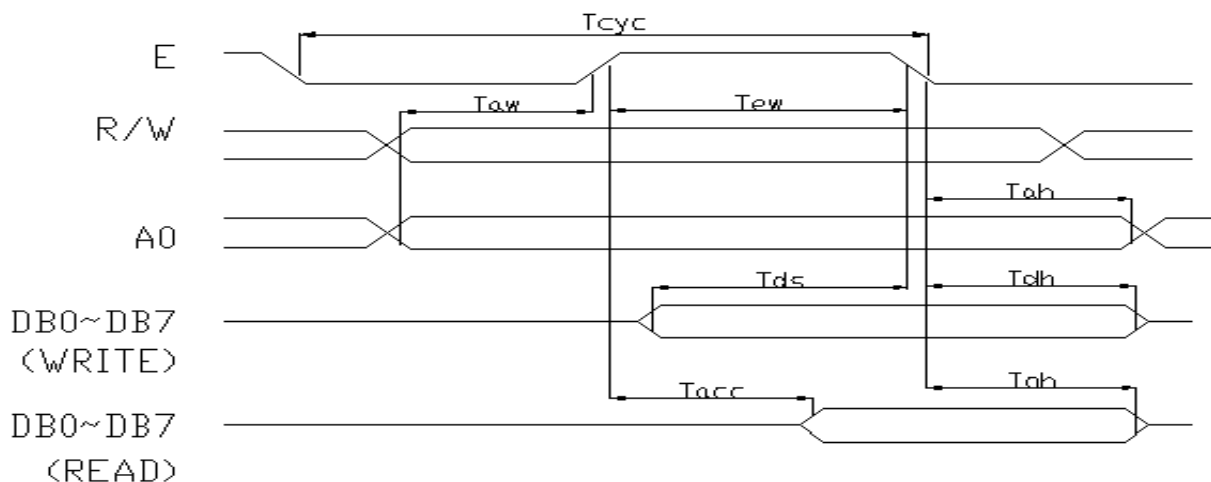
四. 直流特性：（Ta=0~40℃，VDD=2.7~6.0V）

Item	Symbol	Standard Value	Unit
Power Supply	VDD	+2.4 ~ +6.0	V
LCD Driving Voltage	VLCD	-----	V
Input High Voltage	VIN	0.8VDD≤VIN≤VDD	V
Output High Voltage	VOH	0.5VDDmin	V
Input Low Voltage	VIL	0≤VIL≤0.2VDD	V

Output Low Voltage	VOL	0.1VDDmax	V
Power Supply Current	IDD	2max	mA
LCD Power Supply Current	ILCD	220max	uA

五. 交流特性

Signal	Parameter	Symbol	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	VLCD	0~+5V	LCD 外接驱动负电压
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	背光正电源, 可用开关电路控制背光
18	K	GND	背光地

注:) 当 VDD=+3V 时, VLCD=0~-5V

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:insternal 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 Select	0	0	1	0	1	0	1	0	0	0/1	Select the duty ratio 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(dualcommand)	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

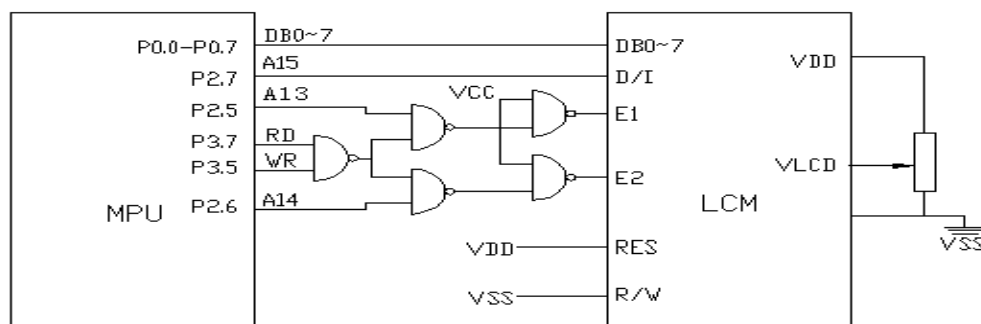
Page	Data		Com No	Drive
2	D0 : D7	: : 122 X 16 PLXELS	1 : :	Slave
3	D0 : D7	: : 122 X 16 PLXELS	16	
0	D0 : D7	: : 122 X 16 PLXELS	17 : :	Master
1	D0 : D7	: : 122 X 16 PLXELS	32	
Column Addr	ADC=0	00H 3C	00H 3C	
	Seg No	0 60	0 60	
	Drive	Slave	Master	

九. 应用举例

ZX12232C 有(1)直接访问方式和(2)间接控制方式两种

ZX12232C 与单片机 8031 的直接访问接口如图 5 所示: (VDD=+5V)

ZX12232C 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 ZX40
LCALL ZX40
LCALL ZX40
LCALL ZX40
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 ZX40
LCALL ZX40
LCALL ZX40
LCALL ZX40
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 ZX40
      LCALL ZX40
      LCALL ZX40
      LCALL ZX40
      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 ZX40
LCALL ZX40
LCALL ZX40
LCALL ZX40

AJMP INITM

ZX40: MOV R7, #0E8H
ZX2:  MOV R6, #0FFH
ZX1:  DJNA R6, ZX1
      DJNZ R7, ZX2
      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, 80H, 80H, 00H, 00H
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, 15H, 55H, 95H, 7FH, 00, 00, 00, 00
DB 00, 80H, 80H, 40H, 20H, 10H, 0CH, 03H, 00, 03H, 0CH, 10H, 20H, 40H, 0C0H, 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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