P32LCD Display Module

Technical Manual

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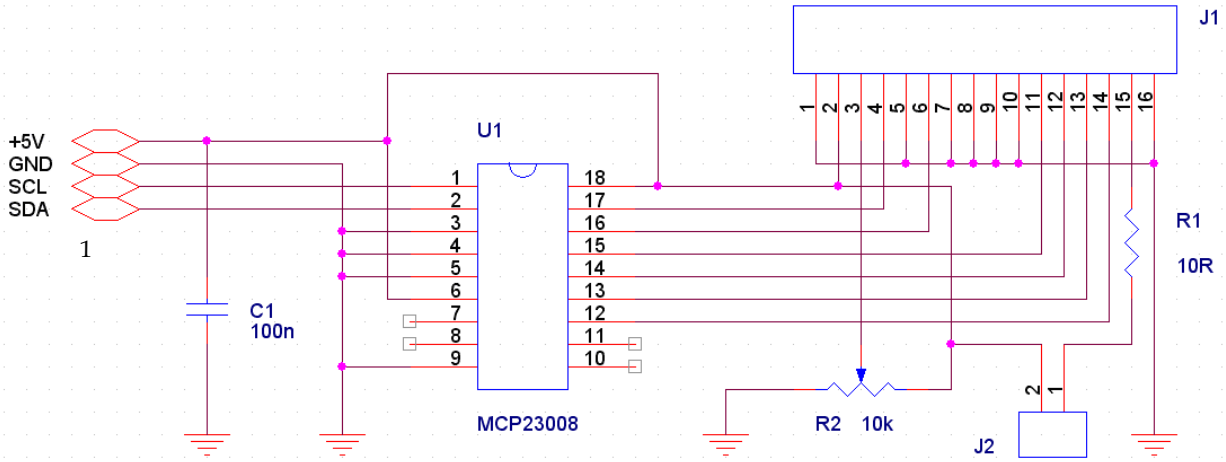
1 Technical Specifications

Parameter	Value
Device kind	Optional LCD module for the PIRA32 RDS Encoder
Display unit	Alphanumerical 16 x 2 characters, white backlight
Active LCD area dimensions	66 x 16 mm
Communication bus	IIC 400 kHz
Firmware version required	1.5b or later
Character set	See Annexes
Power supply	5 V, common with 4-pin bus connector
Supply current	40 mA

2 Schematic Diagram



Adjusting elements:

R2 – LCD contrast
J2 – backlight on/off jumper

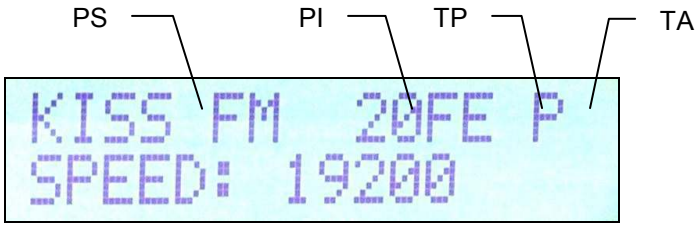
LCD connection (J1):

LCD pin		Connected to
1	Vss	Ground
2	Vcc	+5 V
3	Vee	R2 trimmer
4	RS	U1 pin 17
5	R/W	Ground
6	E	U1 pin 16
7	DB0	Ground
8	DB1	Ground
9	DB2	Ground
10	DB3	Ground
11	DB4	U1 pin 15
12	DB5	U1 pin 14
13	DB6	U1 pin 13
14	DB7	U1 pin 12
15	LED+	+5 V through R1
16	LED-	Ground

3 PIRA32 LCD Output

The LCD area is divided into two lines.

The first line shows key RDS services that require quick access. These services are PS (incl. dynamic), PI, TP and TA.

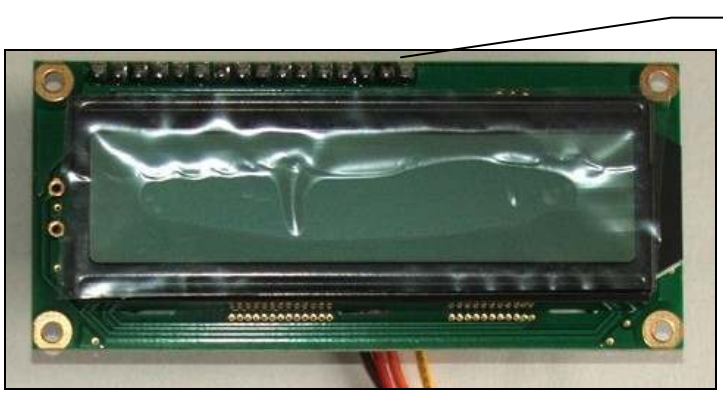


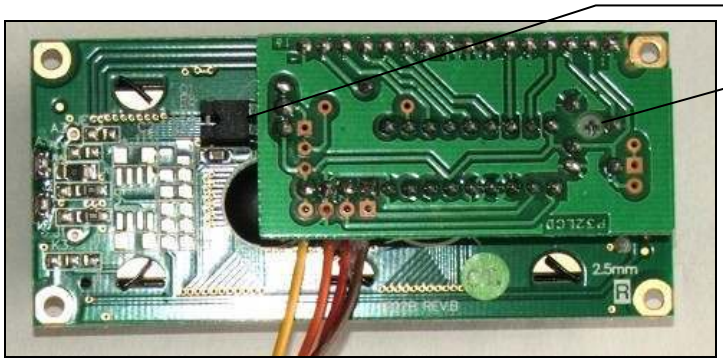
The second line shows the most important status values and RDS services in a loop. Depending on the configuration some values may be omitted. For example if the internal clock source is set for the RDS subcarrier, the PILOT value is not showed. Some events may affect the order. For example if Radiotext changes, it's showed in the next cycle regardless of previous order value.

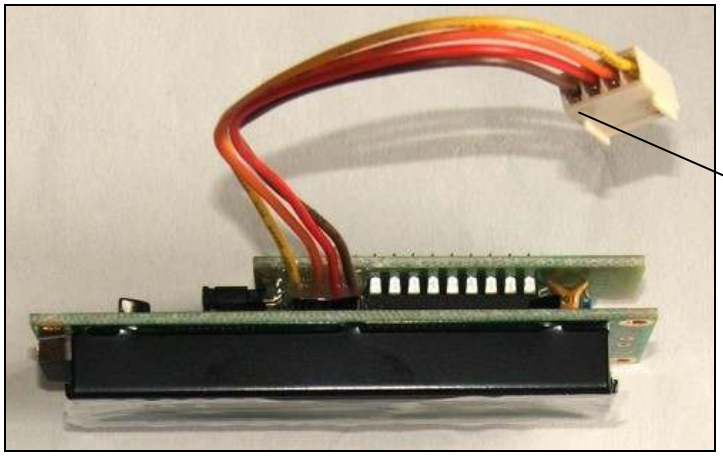
Order	Status value or RDS service	Meaning	Default value
1	RDSGEN	1 = RDS generator enabled, 0 = no RDS output.	1
2	(Reserved)	(This item is currently skipped.)	
3	PROGRAM	Actual program bank selected.	1
4	PTY, MS, DI	Program Type code; Music/Speech; Decoder Identification code.	
5	ADR	The RDS encoder address. If the unit is selected (listening for the ASCII commands), the character '*' is showed.	0 or 255
6	SITE	The site address.	0
7	UECP	1 = The RDS encoder accepts both ASCII and UECP commands, 0 = the RDS encoder accepts ASCII commands only.	0
8	NOHDR	1 = No header communication mode is active, 0 = standard communication mode.	0
9	SPEED	Actual RS232 port speed on which the control commands are expected.	
10	PILOT	1 = pilot tone present, 0 = no pilot tone.	
11	CT	1 = CT enabled, 0 = CT disabled; RDS encoder local time.	
12	GRPSEQ	First 16 items of RDS group sequence.	022E1022EA022XYR
13	RT	Actual Radiotext (sequence of 4 x 16 characters).	

4 ANNEXES

The LCD module layout and dimensions:

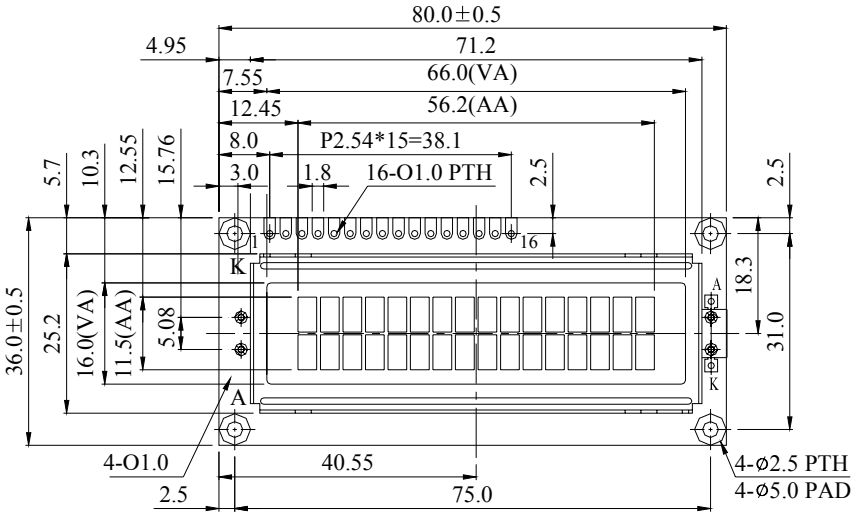


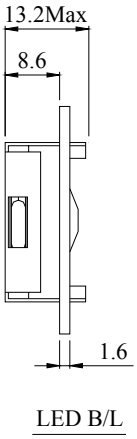




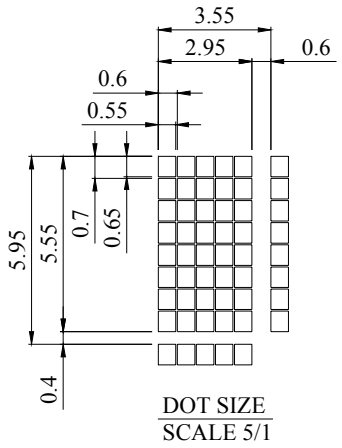
Contour drawing, character set:

5. Contour Drawing &Block Diagram

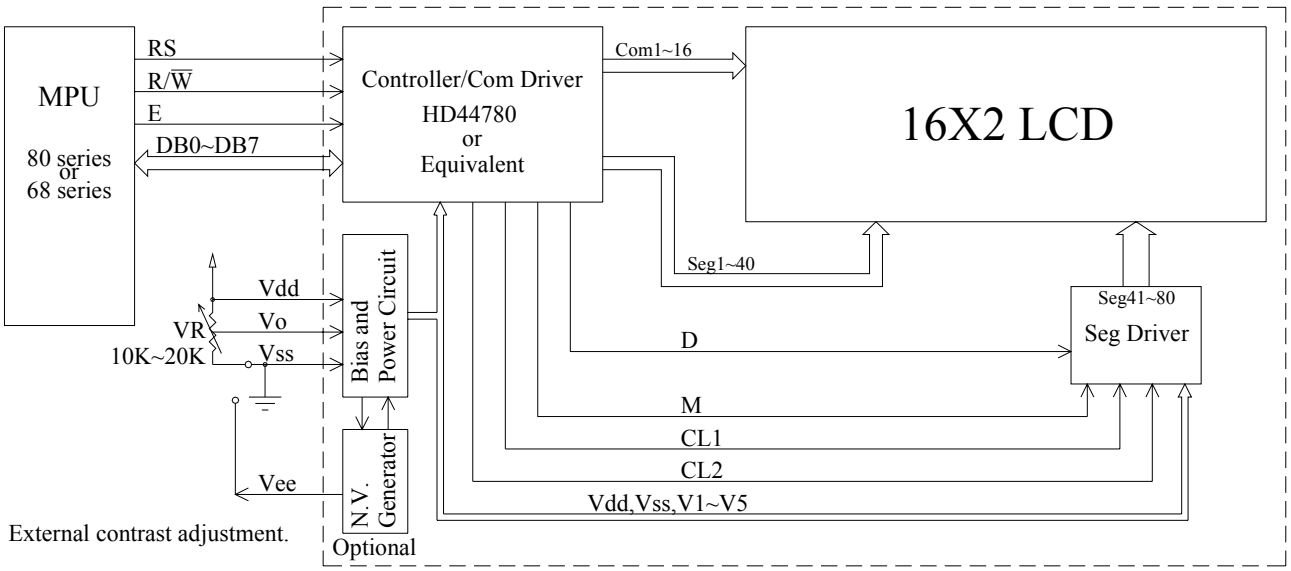




PIN NO.	SYMBOL
1	Vss
2	Vdd
3	Vo
4	RS
5	R/$\overline{W}$
6	E
7	DB0
8	DB1
9	DB2
10	DB3
11	DB4
12	DB5
13	DB6
14	DB7
15	A
16	K



The non-specified tolerance of dimension is ±0.3mm.



Character located	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DDRAM address	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
DDRAM address	40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F

7. Character Generator ROM Pattern

Table 2.

Upper 4 bit / Lower 4 bit	LLLL	LLLH	LLHL	LLHH	LHLL	LHLH	LHHL	LHHH	HLLL	HLLH	HLHL	HLHH	HHLL	HHLH	HHHL	HHHH
LLLL	CG RAM (1)															
LLLH	CG RAM (2)															
LLHL	CG RAM (3)															
LLHH	CG RAM (4)															
LHLL	CG RAM (5)															
LHLH	CG RAM (6)															
LHHL	CG RAM (7)															
LHHH	CG RAM (8)															
HLLL	CG RAM (1)															
HLLH	CG RAM (2)															
HLHL	CG RAM (3)															
HLHH	CG RAM (4)															
HHLL	CG RAM (5)															
HHLH	CG RAM (6)															
HHHL	CG RAM (7)															
HHHH	CG RAM (8)															