

# **PAMS Technical Documentation**

## **THF–10 Series Transceivers**

### **Chapter 4**

### **UIF Module GN4**

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## UIF Module GN4

### Introduction

The User Interface Module is based on DCT2.5's UIF-module. Main difference is the use of parallel datamode in LCD driver and external clock and power supply. Driver clock and negative voltage are supplied from baseband module. Call LED and backlight control circuits are located in baseband module to minimize component amount in UIF-module.

### Mechanics

The module is made from a single printed circuit board – loaded with all the parts for the User Interface Module.

The major mechanical parts on the UI assembly include the following:

- LCD + flexfoil and lightguide
- plastic keydomes for keys and metaldome for powerbutton
- 2 sided 1mm PCB

### Electronics

The following sections of circuitry are included on the PCB:

- LCD Display Module
- Call LED
- Keyboard & Display lighting.
- Keyboard switch matrix.

## Technical Specifications

### DC Characteristics

Pin / Conn.	Symbol	Minimum	Typical / Nominal	Maximum	Unit	Notes
1 / X130	VL		3.3		V	I <sub>max</sub> = 150 mA
6/ X130	VNEG		–5.8		V	

### External Signals and Connections

Connector Name	Notes
UIF Connector	Board to board connector pads
Display Module Connector	FPC footprint for LCD Module

## UIF Module Main Connector X130

Pin	Line Symbol	Minimum	Typical / Nominal	Maximum	Unit	Notes
1	VL		3.3		V	Logic voltage
6	VNEG		-5.8		V	Negative voltage for LCD display
13,14,15,16	GND		0		V	Ground
17-24	LD(0:7)	3.0	3.3	3.42	V	LCD driving lines (high)
	LD(0:7)	0		0.72	V	LCD driving lines (low)
10	LCDCLK	3.0	3.3	3.42	V	Clock signal for LCD Driver (14.4 kHz)
		0		0.72	V	
11	XNWR	3.0	3.3	3.42	V	LCD write enable
		0		0.72	V	
28	XNRD	3.0	3.3	3.42	V	LCD read enable
		0		0.72	V	
25	LCDREG	3.0	3.3	3.42	V	LCD control/data select
		0		0.72	V	
26	LCDCS	3.0	3.3	3.42	V	LCD chip select
		0		0.72	V	
27	LCDRESET	3.0	3.3	3.42	V	LCD reset input
		0		0.72	V	
3,4	BACK-LIGHT		4.4	5.2	V	Backlighting for keymat, display ON
		0		0.5	V	Backlighting for keymat, display OFF
			100		mA	Current for back-lights
12	XPWRON	3.0	3.3	3.42	V	Power control for system, ON / OFF
		0		0.72	V	Power control for system, floating
7-9	ROW(0:2)	3.0	3.3	3.42	V	Lines for keyboard read (High)
		0		0.72	V	Lines for Keyboard read (Low)

## Functional Description

### Circuit Description

The module is connected with 28 pin board to board connector (X130) to the system board.

The module includes following main functional blocks:

- Keyboard
- Illumination
- LCD interface

### Led Drivers

The keyboard and display illumination is achieved by using two transistors in baseband module wired as simple constant current sinks. The LED current is fixed by the values of (R54 to R56 inclusive) and the ratio of R170 on system board.

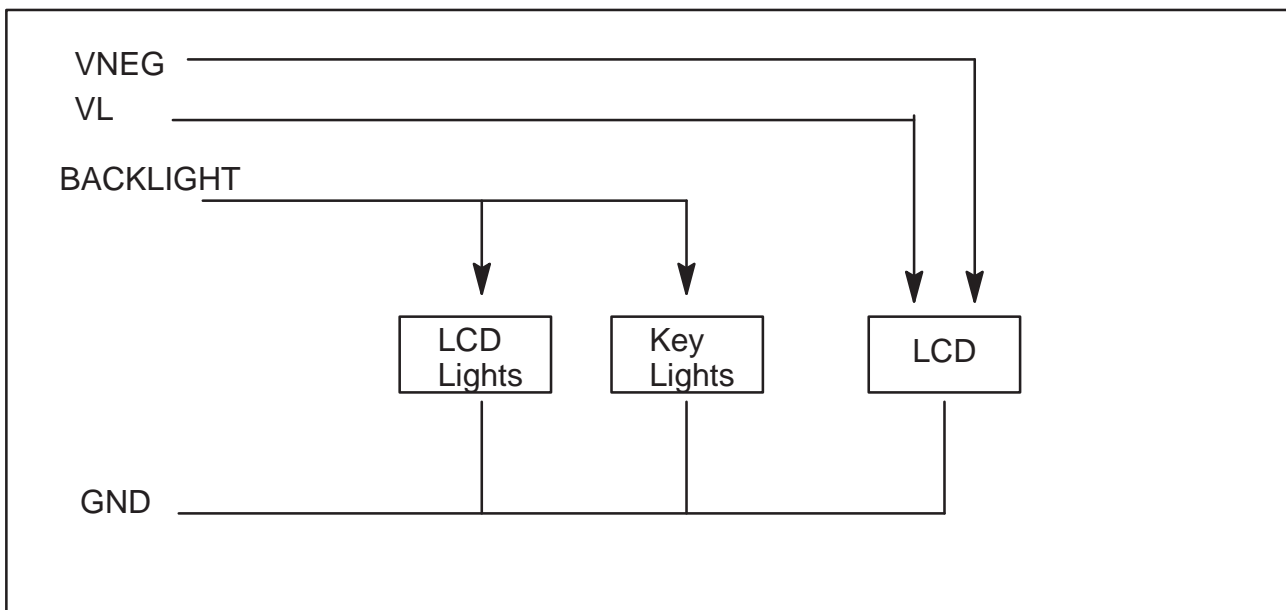
### Keyboard scanning and display driver control

ND(0–6) are used as column lines on keyboard. ROW0–2 are used as a row lines. The Keyboard is connected directly to the controller. ND(0–7) are output lines and ROW0–4 are input lines. Watchdog is updated same time with keyboard scanning (XPWROFF). Keyboard scanning is done by driving one ND to 0 V at time and ROWs are used to read which key is pressed.

### LCD module

The LCD module includes the LCD and the display driver. The display driver has an external clock oscillator. The clock frequency is 14.4 kHz. The LCD driver is controlled in parallel mode. Reading and writing to LCD RAM is controlled by XNRD, XNWR and LCDCS control lines.

For the contrast control of the LCD display a negative supply voltage is required by the display driver. That is generated in the baseband module from the LCD-clock by the use of a diode pump and filtering. The generated negative voltage is fed to Vout input in LCD driver. Internal voltage regulator requires resistor circuit R62 and R63 which is used for keeping the contrast at same level under any circumstances.

**Power Distribution Diagram**

**Parts list of GN4** (EDMS Issue 2.9)

Code: 0200964

ITEM	CODE	DESCRIPTION	VALUE	TYPE
R101	1430101	Chip resistor	390 k	5 % 0.063 W 0603
R102	1430103	Chip resistor	470 k	5 % 0.063 W 0603
R110	1430035	Chip resistor	1.0 k	5 % 0.063 W 0603
R111	1430035	Chip resistor	1.0 k	5 % 0.063 W 0603
R112	1430035	Chip resistor	1.0 k	5 % 0.063 W 0603
R113	1430035	Chip resistor	1.0 k	5 % 0.063 W 0603
R114	1430035	Chip resistor	1.0 k	5 % 0.063 W 0603
R115	1430035	Chip resistor	1.0 k	5 % 0.063 W 0603
R116	1430035	Chip resistor	1.0 k	5 % 0.063 W 0603
R120	1430163	Chip resistor	33	5 % 0.063 W 0603
R121	1430163	Chip resistor	33	5 % 0.063 W 0603
R122	1430167	Chip resistor	47	5 % 0.063 W 0603
R123	1430001	Chip resistor	100	5 % 0.063 W 0603
C101	2320059	Ceramic cap.	100 p	5 % 50 V 0603
C102	2310003	Ceramic cap.	470 n	10 % 16 V 0805
C103	2310003	Ceramic cap.	470 n	10 % 16 V 0805
C104	2310003	Ceramic cap.	470 n	10 % 16 V 0805
C105	2310003	Ceramic cap.	470 n	10 % 16 V 0805
C106	2310003	Ceramic cap.	470 n	10 % 16 V 0805
C107	2312293	Ceramic cap.		Y5 V 1206
C108	2320059	Ceramic cap.	100 p	5 % 50 V 0603
C120	2320059	Ceramic cap.	100 p	5 % 50 V 0603
H001	4850031	LCD display module		83x41 icons+driver+ta
V010	4864301	Led	Green	1305
V011	4864301	Led	Green	1305
V012	4864301	Led	Green	1305
V013	4864301	Led	Green	1305
V014	4864301	Led	Green	1305
V015	4864301	Led	Green	1305
V016	4864301	Led	Green	1305
V017	4864301	Led	Green	1305
V018	4864301	Led	Green	1305
V019	4864301	Led	Green	1305
V020	4864301	Led	Green	1305
V021	4864301	Led	Green	1305
V022	4864301	Led	Green	1305
V023	4864301	Led	Green	1305
V024	4864301	Led	Green	1305
V025	4864301	Led	Green	1305
V026	4864301	Led	Green	1305
	9467021	Lightguide		dmc01254 thf-10
	9510413	LCD Gasket	DMD	
	9795037	Keydomes		thf-10 gn4

9795046 Power Dome DMD03588  
9854199 PCB GN4 43.5X116.7X1.0 D 12/PA