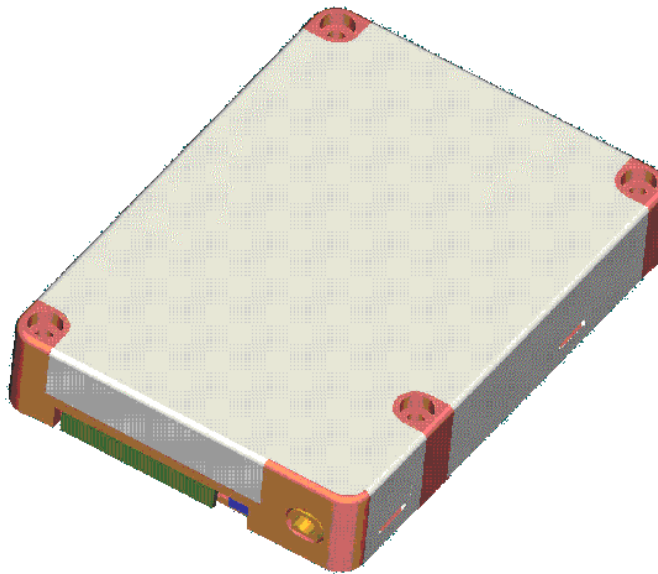

PRELIMINARY

WMOi3 Integrated modem preliminary specification



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Version : 1.1

Date : 25/01/00

DOCUMENT AMENDMENTS				
ISSUE	DATE	STATUS	AUTHOR	COMMENTS
1.0	28/10/99	P	SDE	Creation
1.1	25/01/00	P	FDO/DMA	Modifications

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1. Introduction

1.1. Scope

This preliminary document describes the interfaces and the technical specifications for the integrated modem called WMOi3.

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2. Generality

2.1. Phylosophy

The integrated modem is a product with a sole connector which puts together all the interface signals in order to facilitate its integration.

It has an integrated SIM connector as well as a standard RF connector type MMCX (Miniature Micro Connector).

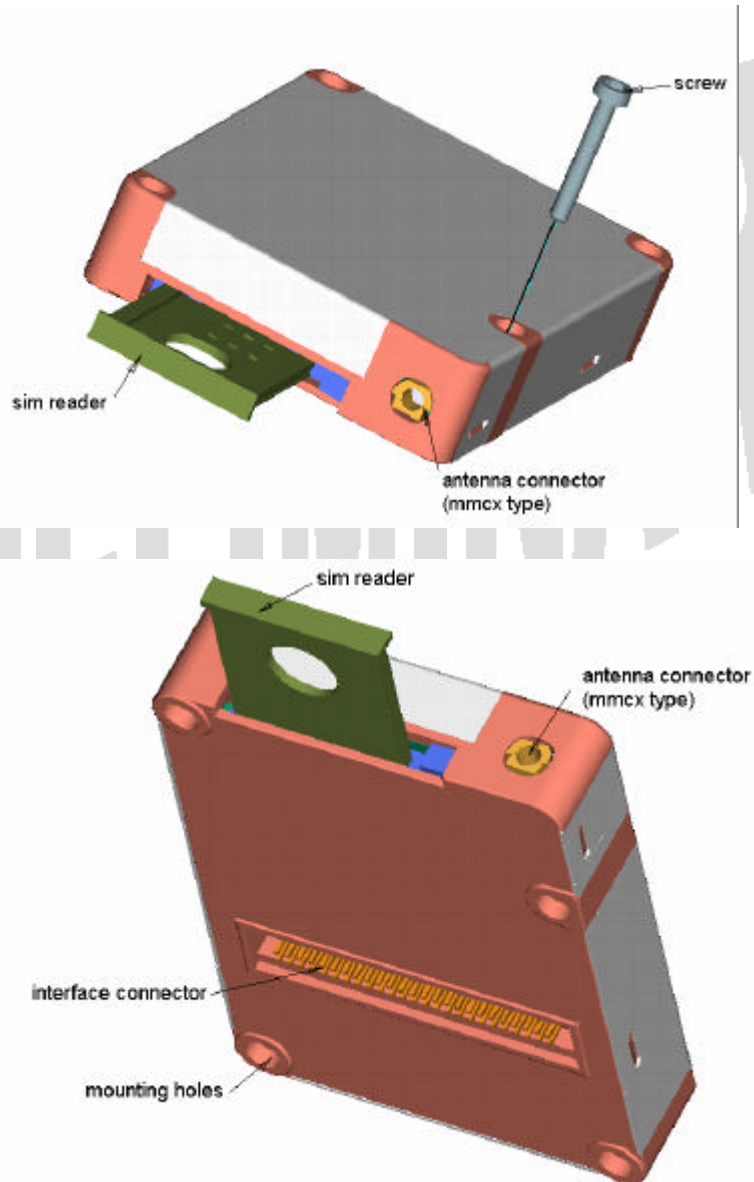
2.2. Physical characteristics

The WMOI3 integrated modem has a complete self-contained shield.

The physical characteristics are the following ones:

Physical characteristic	Qualification
Dimension	46 x64 x 12.4 mm
Absolute maximum dimension	
Weight	About 80 g
Volume	36.21 cm ³
Case	Zamack + stainless steel

2.3. Integrated modem design



* For technical drawing see Annexe A

3. Interfaces description

3.1. The main connector

This is a 50 pins interface connector with a pitch of 1.27 from SAMTEC, referenced **FTS-125-01-L-DV**. (see figure1)

Figure 1 : 50 pins connector Bottom view

GND	2	1	GND
+5V	4	3	+5V
GND	6	5	CT109/DCD
SPK2N	8	7	GPIO2
SPK2P	10	9	CT125/RI
SPK1P	12	11	GPIO1
SPK1N	14	13	CT106/CTS
MIC2P	16	15	ON/~OFF
MIC2N	18	17	AUXV0
MIC1P	20	19	~RST
MIC1N	22	21	INTR
GND	24	23	BOOT
GPIO0	26	25	CT103/TX
CT104/RX	28	27	CT107/DSR
CT105/RTS	30	29	CT108-2/DTR
COL4	32	31	COL3
COL2	34	33	COL1
COL0	36	35	ROW4
ROW3	38	37	ROW2
ROW1	40	39	ROW0
SPI_EN	42	41	GND
SPI_CLK	44	43	SPI_IO
SIMRST	46	45	SIMCLK
SIMPRES1	48	47	SIMVCC
GND	50	49	SIMDATA

The following table describes the electrical characteristics of the interface.

Some signals require particular connections and are specified in bold characters.

Pin #	Name	I/O	I/O type	Description	Comment
1	GND			GROUND	High current
2	GND			GROUND	High current
3	+5V	I	Supply		High current
4	+5V	I	Supply		High current
5	CT109/DCD	O	CMOS/2X	RS232-Data Carrier Detect	
6	GND			GROUND	High current
7	GPIO2	I/O	CMOS/2X	General Purpose I/O	
8	SPK2N	O	Analog	Speaker2 negative output	
9	CT125/RI	O	CMOS/2X	RS232-Ring Indicator	
10	SPK2P	O	Analog	Speaker 2 positive output	
11	GPIO1	I/O	CMOS/2X	General Purpose I/O	
12	SPK1P	O	Analog	Speaker 1 positive output	
13	CT106/CTS	O	1X	RS232 interface Clear To Send	
14	SPK1N	O	Analog	Speaker 1 negative output	
15	ON/~OFF	I		Power ON/OFF control	
16	MIC2P	I	Analog	Microphone 2 positive input	
17	AUXV0	I	Analog	Auxiliary ADC input	
18	MIC2N	I	Analog	Microphone 2 negative input	
19	~RST	I		Reset active low	Open Collector
20	MIC1P	I	Analog	Microphone 1 positive input	
21	GND	I		Ground	
22	MIC1N	I	Analog	Microphone 1 negative input	
23	BOOT	I		BOOT	Open Collector
24	GND			GROUND	High current
25	CT103/TX	I		RS232 interface - Transmit	Pull up to VCC with 100KW when not used
26	GPIO0	I/O	CMOS/2X	General Purpose I/O	See 3.2.3
27	CT107/DSR	O	1X	RS232 interface Data Set Ready	
28	CT104/RX	O	1X	RS232 interface – Receive	
29	CT108-2/DTR	I		RS232 interface Data Terminal Ready	Pull up to VCC with 100KW when not used
30	CT105/RTS	I		RS232 interface Request To Send	Pull up to VCC with 100KW when not used

31	COL3	I/O	1X	Keyboard column	
32	COL4	I/O	1X	Keyboard column	
33	COL1	I/O	1X	Keyboard column	
34	COL2	I/O	1X	Keyboard column	
35	ROW4	I/O	1X	Keyboard row	
36	COL0	I/O	1X	Keyboard column	
37	ROW2	I/O	1X	Keyboard row	
38	ROW3	I/O	1X	Keyboard row	
39	ROW0	I/O	1X	Keyboard row	
40	ROW1	I/O	1X	Keyboard row	
41	GND			GROUND	High current
42	SPI_EN	O	1X	SPI enable	
43	SPI_IO	I/O	1X	I ² C Data or SPI Data	
44	SPI_CLK	O	1X	I ² C Clock or SPI Clock	
45	SIMCLK	O	2X	Clock for SIM Interface	3V mode
46	SIMRST	O	2X	Reset for SIM interface	3V mode
47	SIMVCC	O		SIM card supply	3V mode 6mA max
48	SIMPRES1	I		SIM card detect	Connected to SIM connector pin 8. Pin 4 of SIM connector must be pulled down to GND with 1 KW
49	SIMDATA	I/O	3X	I/O for SIM interface	3V mode
50	GND			GROUND	High current

All digital I/O are CMOS 3V compatible.

Operating conditions

Parameter	I/O type	Min	Max	Condition
V_{IL}	CMOS	-0.5V	0.8V	
V_{IH}	CMOS	2.1V	3.0V	
V_{OL}	1X		0.2V	I_{OL} = -1 mA
	2X		0.2V	I_{OL} = -2 mA
	3X		0.2V	I_{OL} = -3 mA
V_{OH}	1X	2.6V		I_{OH} = 1 mA
	2X	2.6V		I_{OH} = 2 mA
	3X	2.6V		I_{OH} = 3 mA

3.2. Pin Description

3.2.1. Power supply

The main power supply will be provided through a double connection.

These connections are respectively the pin 3 and 4 for the +5V and the pins 1 and 2 for the ground (GND).

The power supply is 5V +/-5% 1A.

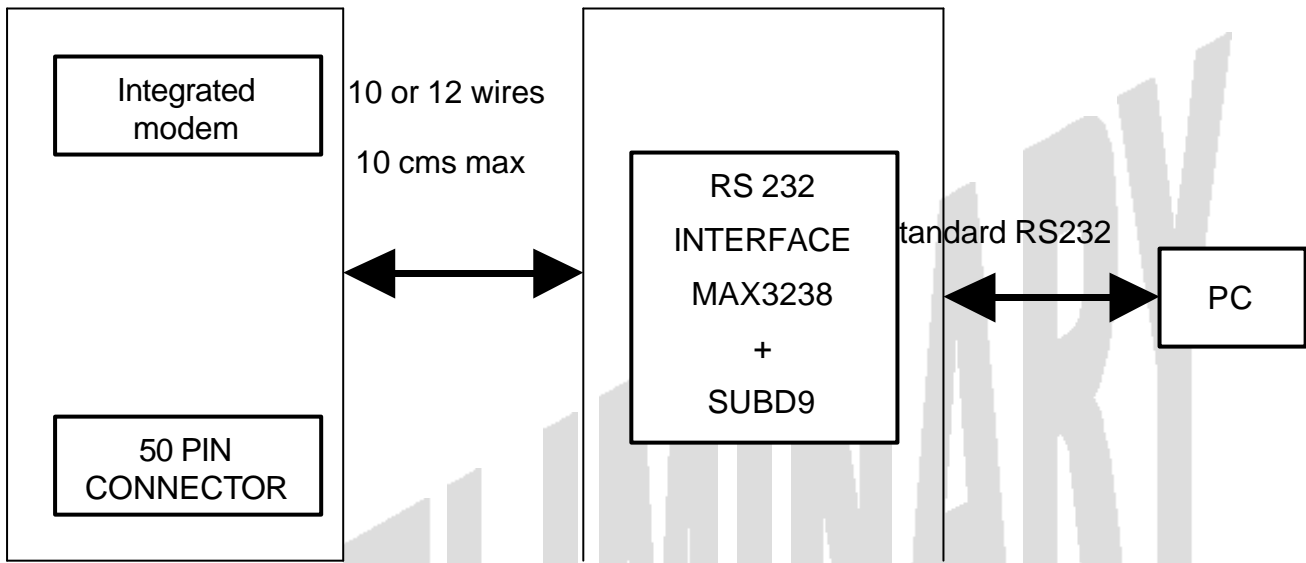
3.2.2. Serial Link RS232

This interface is needed for communication with a remote terminal with respect to the RS232 V.28 standard levels. As the integrated modem does not include a transceiver MAX3238 or MAX3237, this one has to be added outside with a SUBD9 (connected to the integrated modem through a short 10 or 12 wires cable for example). These transceiver and SUBD9 can then be connected to the PC with a standard RS232 cable. The table below lists the needed signals for this interface :

PIN number	Signal	Description
5	DCD	Data Carrier Detect
28	RX	Reception
25	TX	Transmission
29	DTR	Data Terminal Ready
27	DSR	Data Set Ready
30	RTS	Request To Send
13	CTS	Clear To Send
9	RING	Ring indicator
2	GND	Ground
4	+5V	Interface Power Supply
19	RST	General Reset (optionnal)
23	BOOT	Boot signal for downloading (optionnal)

When the RS232 V.28 level is not needed, the above signals can be used as TTL 3V CMOS compatible signals.

Application example needing V.28 levels :



3.2.3. Remote SIM interface

A SIM connector is already integrated on the integrated modem (see 3.3 SIM interface). However there is the possibility to implement a remote SIM connector using the signals described in the table below.

PIN number	Signal
47	SIMVCC
46	SIMRST
45	SIMCLK
50	GND
49	SIMDATA
48	SIMPRES
26	GPIO0

The GPIO0 pin is used to drive a bi-directional level shifter (LTC 55 or similar) to allow the use of 3V and 5V SIMs as well.

3.2.4. AUDIO

The modem allows the connection of a handset or a headset through AUDIO signals

The audio end stage must respects the following specifications :

ÿ Microphone

The microphone inputs are differential inputs. They already contain the necessary biasing for an electret microphone (0,5 mA and 2 Volts). Connection is direct. The impedance of the microphone has to be around $2k\Omega$. The microphone inputs gain can be adjusted by AT command. Gain can be tuned from 30dB to 51dB. Connection can be differential or single-ended but it is recommended to use differential connection to reject common mode noise and TDMA noise.

ÿ Speaker

Speaker outputs are push-pull amplifiers and can drive loads down to 50 Ohms and up to 1nF. These outputs are differential and the output power can be adjusted by step of 2dB with AT command. The output can be connected directly to a speaker. Connection can be differential or single-ended but it is recommended to use differential connection to reject common mode noise and TDMA noise.

The audio signal are :

	Signal	Pin number	Description	
Audio	1	MIC1P	20	Microphone 1 positive input
		MIC1N	22	Microphone 1 negative input
		SPK1P	12	Speaker 1 positive output
		SPK1N	14	Speaker 1 negative output
Audio	2	MIC2P	16	Microphone 2 positive input
		MIC2N	18	Microphone 2 negative input
		SPK2P	10	Speaker 2 positive output
		SPK2N	8	Speaker 2 negative output

3.3. SIM Interface

The provided SIM connector has been designed for **3V technology SIMs only**

3.4. RF interface

The RF connector is MMCX (Miniature Micro Connector) standard type for a surface mounting.

An antenna can be directly connected through the mating connector or using a small MMCX / SMA adaptor.

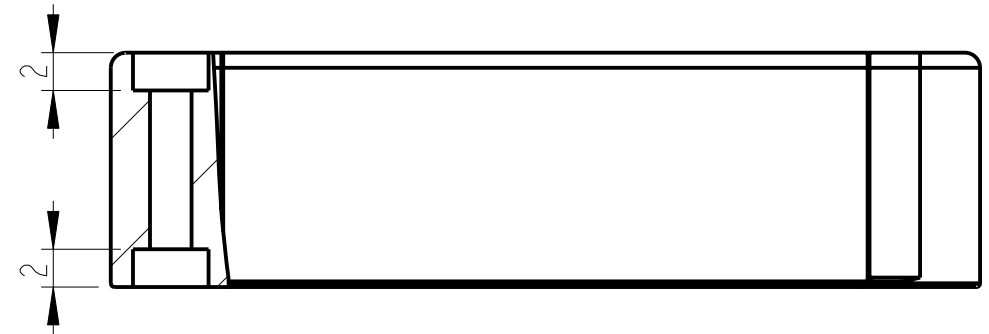
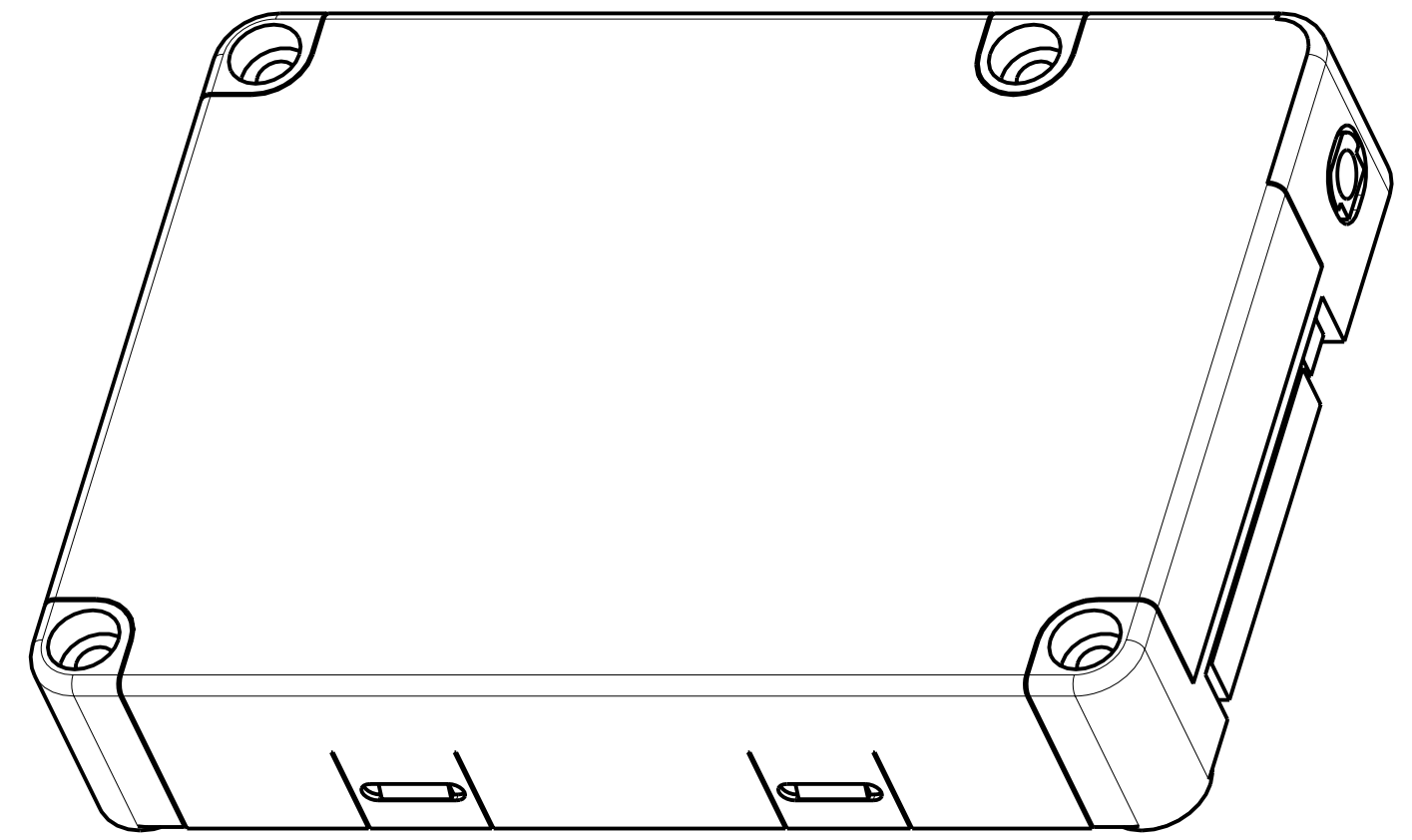
The antenna must comply with the following specifications :

	EGSM	DCS
Frequency RX	925 to 960 MHz	1805 to 1880 MHz
Frequency TX	880 to 915 MHz	1710 to 1785 MHz
Impedance	50 Ω	

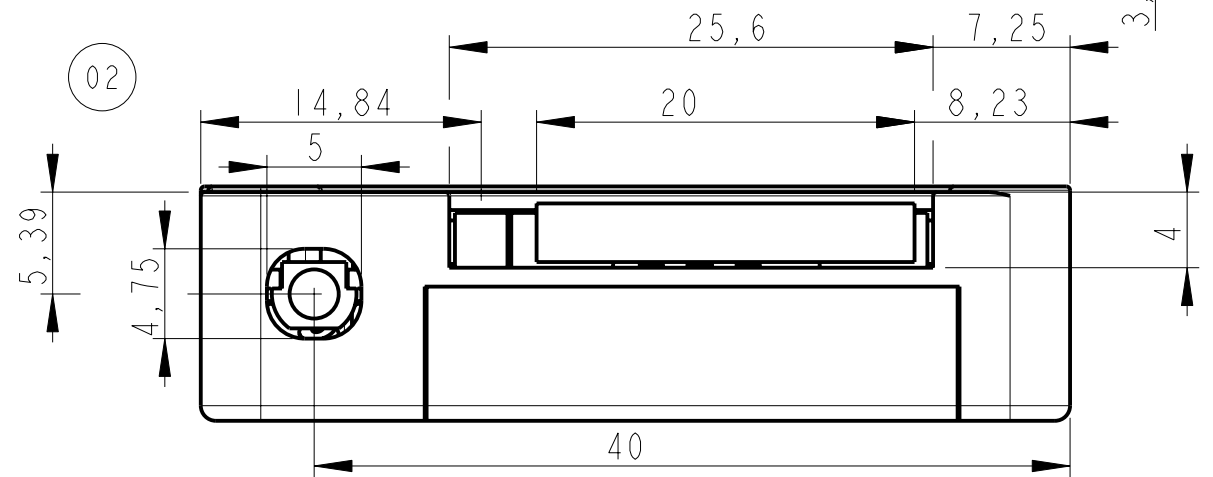
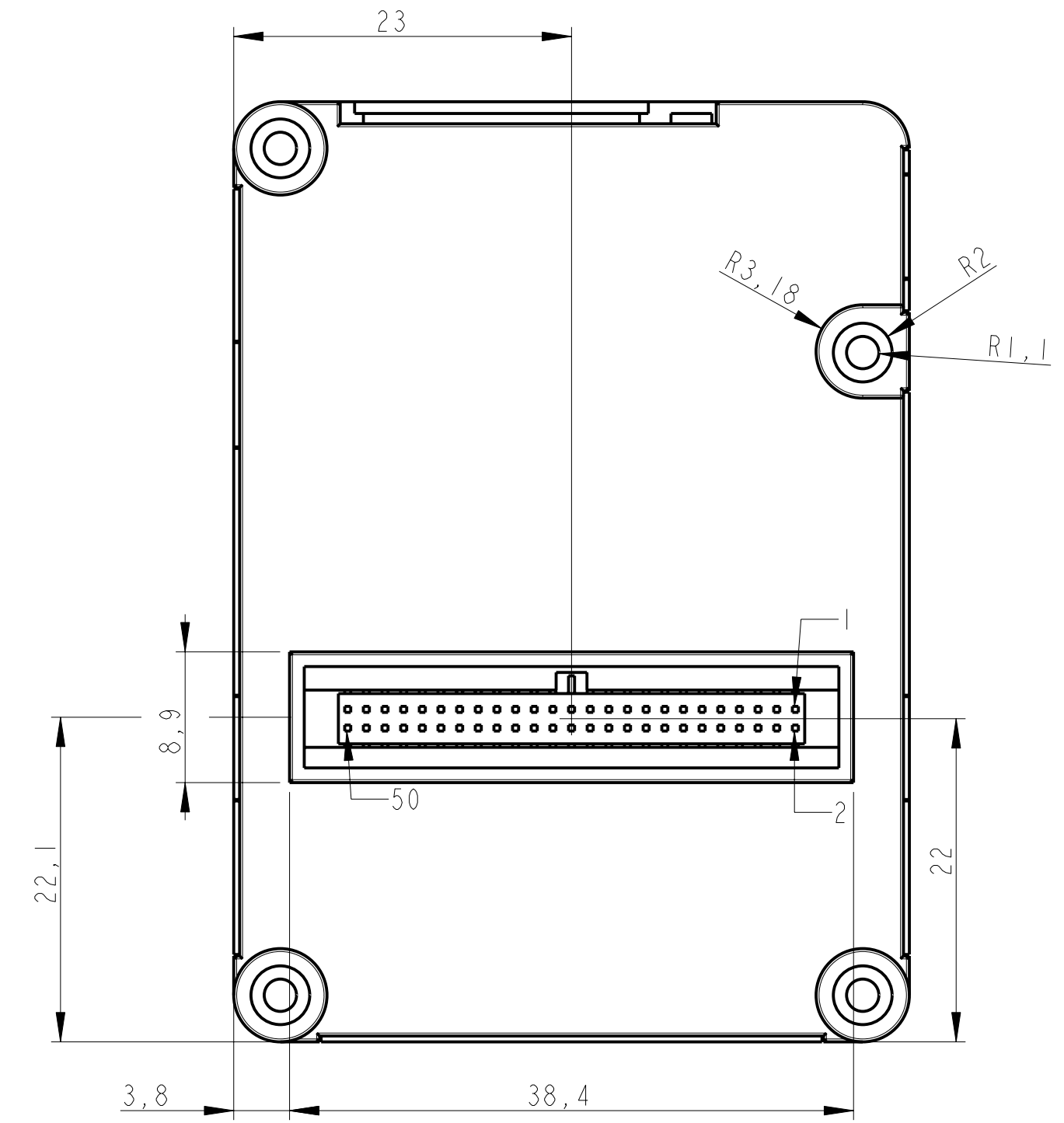
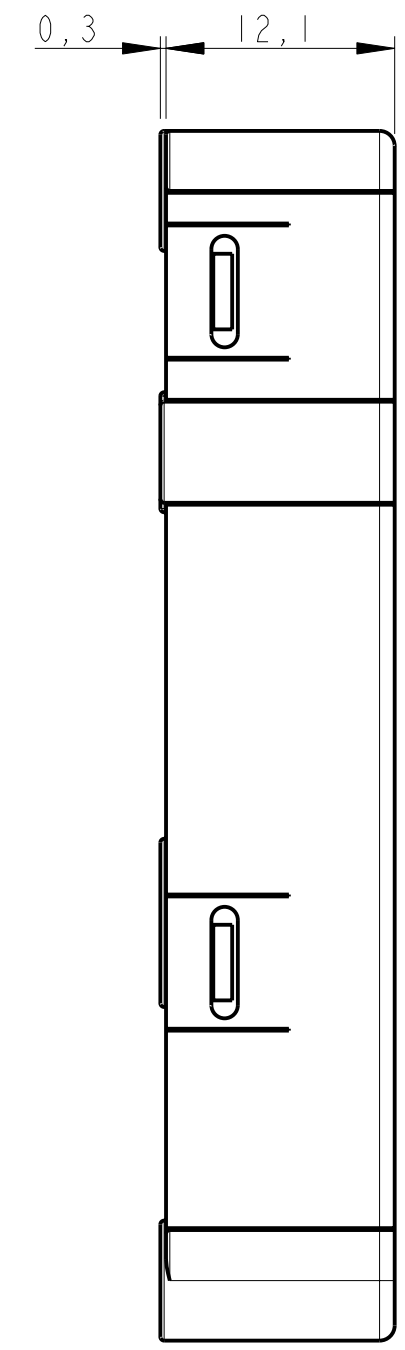
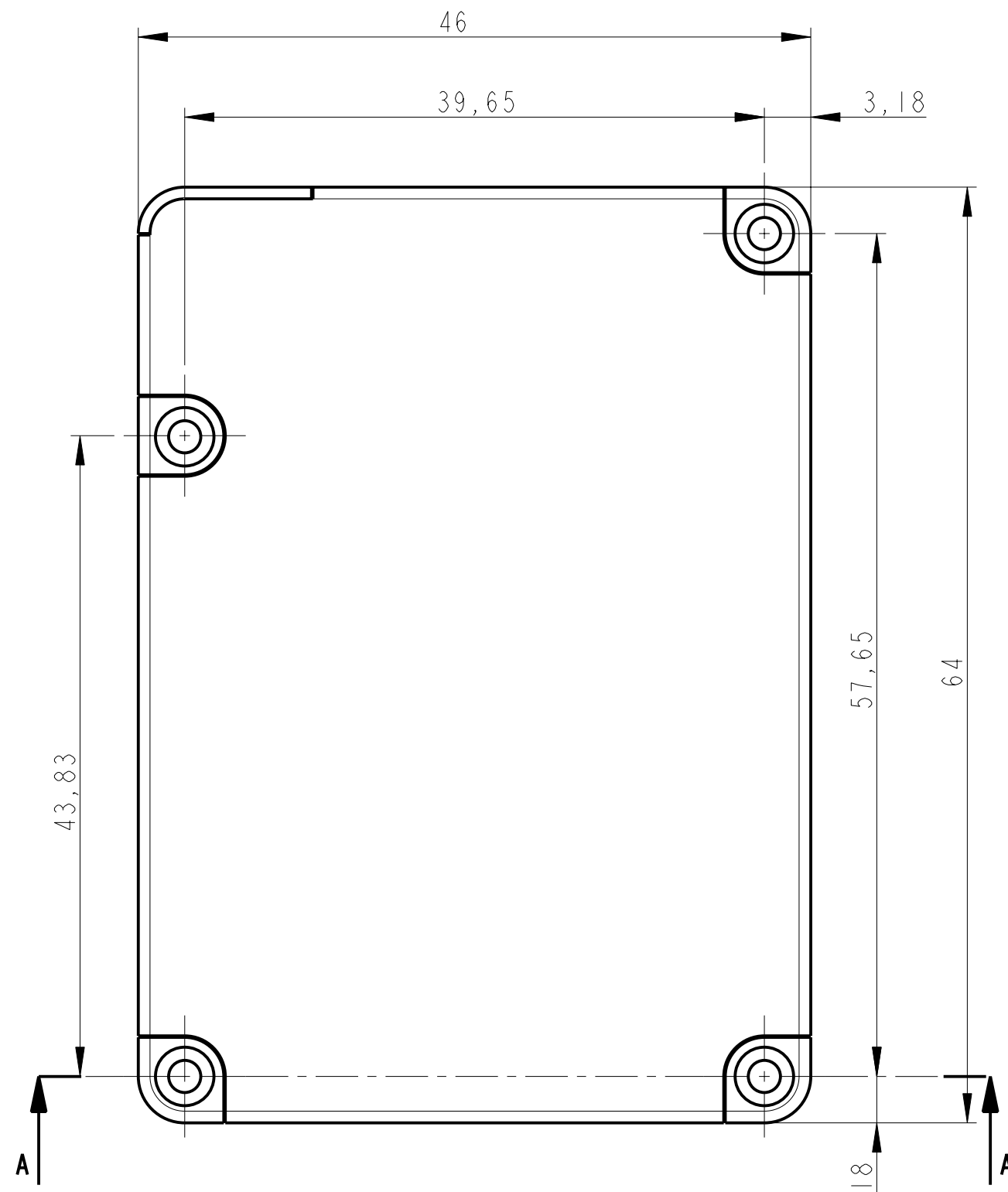
4. Appendix

4.1. Mechanical Drawings

PRELIMINARY



SECTION A-A



MODIFICATION	DATE	AUTHOR	STATUS
More dimensions	01 - 12 - 00	T. OGER	Preliminary
Modifications	11 - 16 - 99	T. OGER	Preliminary
Creation	10 - 28 - 99	T. OGER	Preliminary

WMO13_ASSEMBLY		SCALE: 2,500	FORMAT: A2	02
WM-2-930-X-001-A				00
WAVECOM	AUTHOR T. OGER	FOLIO: 1/1	IND.	

