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IPAM Carrier PCB for IPAM 10x

DEVELOPMENT SPECIFICATION

Carrier board for the Barix IP Audio Module 101 and 102, with Ethernet, USB, dual RS-232, Mic In, Stereo In/Out, four I/O ports, reset button input, wide range DC power input and a holder for a realtime clock iButton

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Hardware Rev.	HW 1.1

Table of Contents

1 Introduction

1.1 About this document

This DEVELOPMENT SPECIFICATION aims at giving insight to detailed technical aspects of the Barix IPAM Carrier PCB and complements the information given in the product sheet.

1.2 Additional documents

As several different applications and different standard firmware packages can be used with the Barix IPAM Carrier PCB, the process of loading or updating a software is also covered in this document.
For information about the configuration of the loaded application or firmware please refer to the corresponding software user manual and firmware technical documentation.

1.3 About the IPAM Carrier PCB

The Barix IPAM Carrier PCB allows manufacturers to test the capabilities of the Barix IP Audio Module prior to designing their custom board. The Barix IP Audio Module (100, 101 or 102) can be directly plugged onto the IPAM Carrier PCB.

1.4 Hardware features

The Barix IPAM Carrier PCB features:

- RJ-45 100Mbit Ethernet port
- USB1.1 Type “A” receptacle (for devices like memory sticks)
- 2 independent RS-232 serial ports (D-sub on front, 10 pin on board header)
- Unbalanced Microphone input with Bias Voltage (3-pin header)
- Unbalanced Standard stereo Line Inputs (4-pin header)
- Unbalanced Standard stereo Line Outputs (4-pin header)
- Reset and Default settings button input
- 4 General purpose IO ports (inputs tolerate TTL-Level, outputs supply 3.3VDC)
- Single power input 8 to 35 Volt DC power source (consumption 2.3W max.)
- On-board 12VDC voltage regulator for external serial devices (LCD, keypad...)
- Socket for Real Time Clock iButton (Dallas DS1904)
- Small form factor (4” x 3.3” x 0.75” / 103mm x 84mm x 19mm)
- Aluminum front plate (4.3” x 0.9” x 0.045”/ 109.2mm x 23mm x 1.4mm)
- 4 mounting holes (0.106”/2.7mm) for PCB fixation
- 2 mounting holes (0.106”/2.7mm) for fixation of IP Audio Module 10x

1.5 Supported Barix IP Audio Modules

The Barix IPAM Carrier PCB supports the Barix IP audio module IPAM 100, 101 and 102. For technical details on the audio module please refer to the corresponding product sheet and the development specification.

1.6 Available Applications and Firmware packages

The supported IPAM 100, 101 and 102 audio modules can be loaded with different firmware packages featuring:

- Embedded and robust operating system with fully routable IP stack
- IP standard based protocols (TCP/IP, UDP, HTTP, ICMP, SNMP)
- Supports BootP, DHCP, Auto IP and IPzator
- Integrated web server for configuration, control, update and streaming functions
- Fully documented Application Programming Interface (API)
- Highly customizable User Interface (HTML) with development kit
- Special software features in OEM versions on request

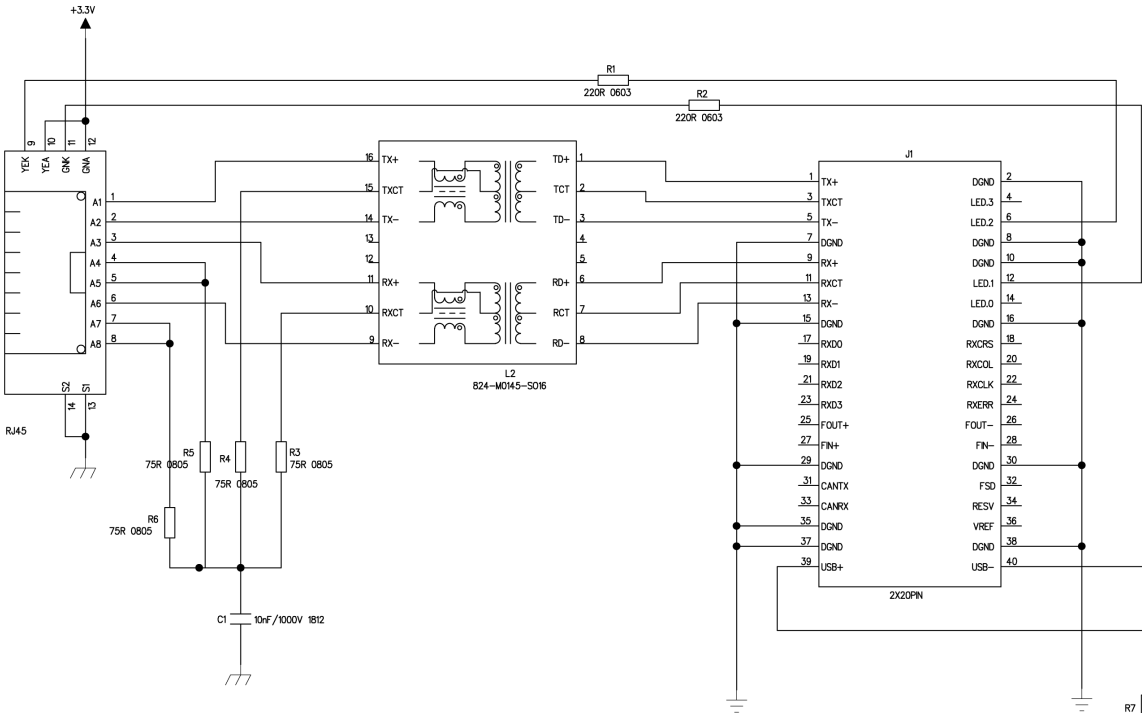
Other standard firmware packages as well as ABCL applications can be downloaded from the Barix website.

2 Hardware

2.1 Network Interface

The Barix IPAM Carrier PCB is equipped with one RJ45 Ethernet interface (10/100MBit, full / half duplex, auto negotiation) available on the front.

Schematic Ethernet

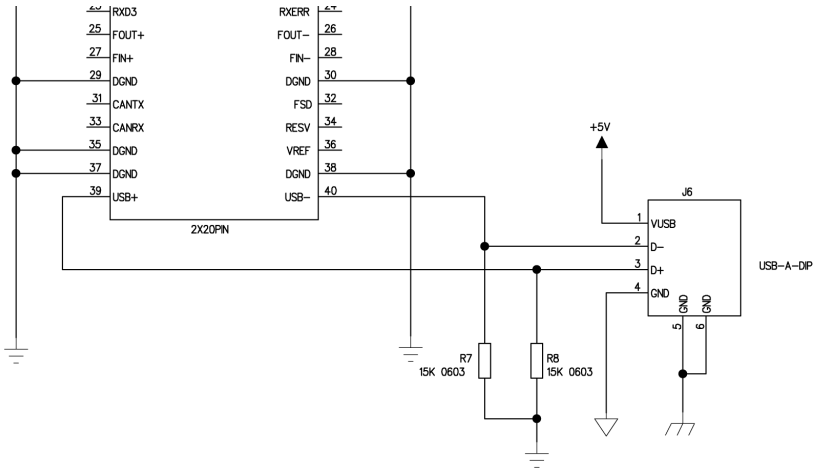


2.2 USB Interface

The USB Type “A” receptacle, available on the front, is V1.1 compatible and can be used for mass storage devices such as Flash memory sticks.

The attached USB device is powered with 5VDC over a Raychem resettable 1.5 Amp fuse (F1) for short circuit protection and may draw up to 500 mA resulting in a consumption of 2.5 W max.

Schematic USB

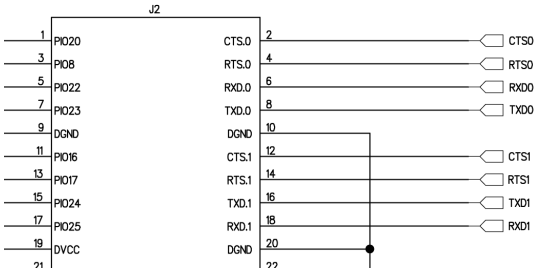


2.3 Serial Interfaces

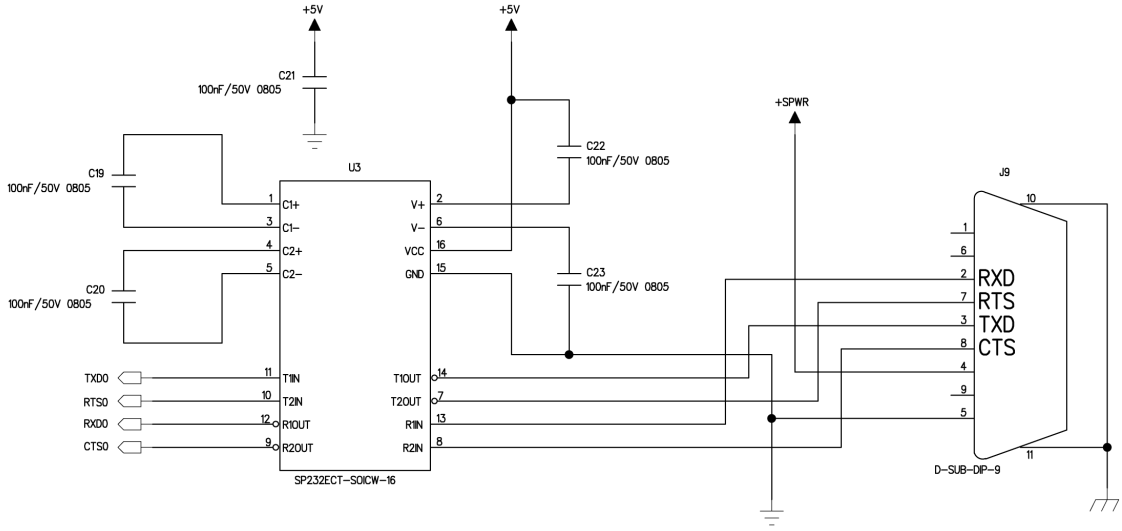
Two independent serial standard interfaces RS-232 are implemented. Port 1 is a 9 pin male D-sub connector on the front while the second port is available on the board via a 2x5 pin header.

Both ports carry the signals RXD, TXD, RTS, CTS and Ground. See also section “Power for serial devices” (signal SPWR) further below.

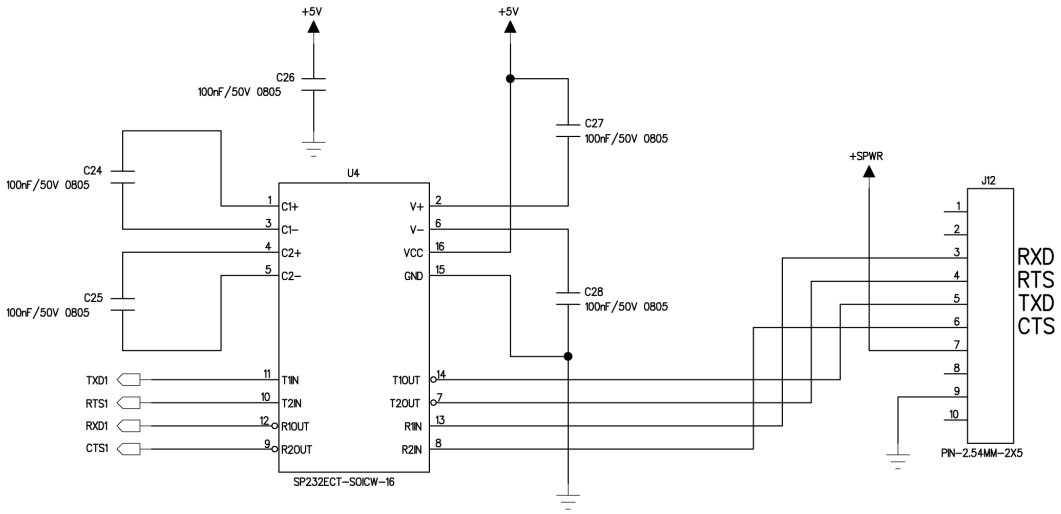
Schematic COM signals (J2)



Schematic COM1



Schematic COM2



Power for serial devices

External devices can be powered by either (jumper selectable on J7) the input voltage (VIN) or over a 12VDC voltage regulator. The serial power (SPWR) is available on pin 4 of J9 (COM1) and pin 7 of J12 (COM2).

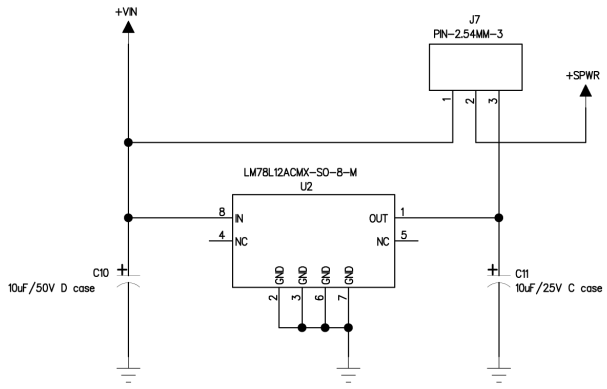
The 12VDC regulator is a LM78L12ACM type (Chip U2) and requires a VIN of 14VDC or greater.
If the power input voltage (VIN) is smaller then 14VDC then expect SPWR to be approximately 2 Volts less.

Features of the LM78L12ACM :

- Output voltage tolerances of ±5% over the temperature range
- Output current of 100 mA
- Internal thermal overload protection
- Output transistor safe area protection
- Internal short circuit current limit

When SPWR is set to V_{IN} directly (Jumper head on pin 1 and pin 2 on J7) make sure that the voltage on V_{IN} meets the power specification of attached devices.

Schematic SPWR



SPWR consumption considerations

- When attaching devices to the serial ports and selecting by jumper J7 to power them from V_{IN} directly, the total consumption is increased by the consumption of these devices.

- When attaching devices to the serial ports and selecting by jumper J7 to power them from the 12VDC regulator (100mA max), the total consumption is increased up to 1.2 Watt. plus the power dissipated by the 12VDC regulator U2 (12V * I + (Vin-12V) * I).

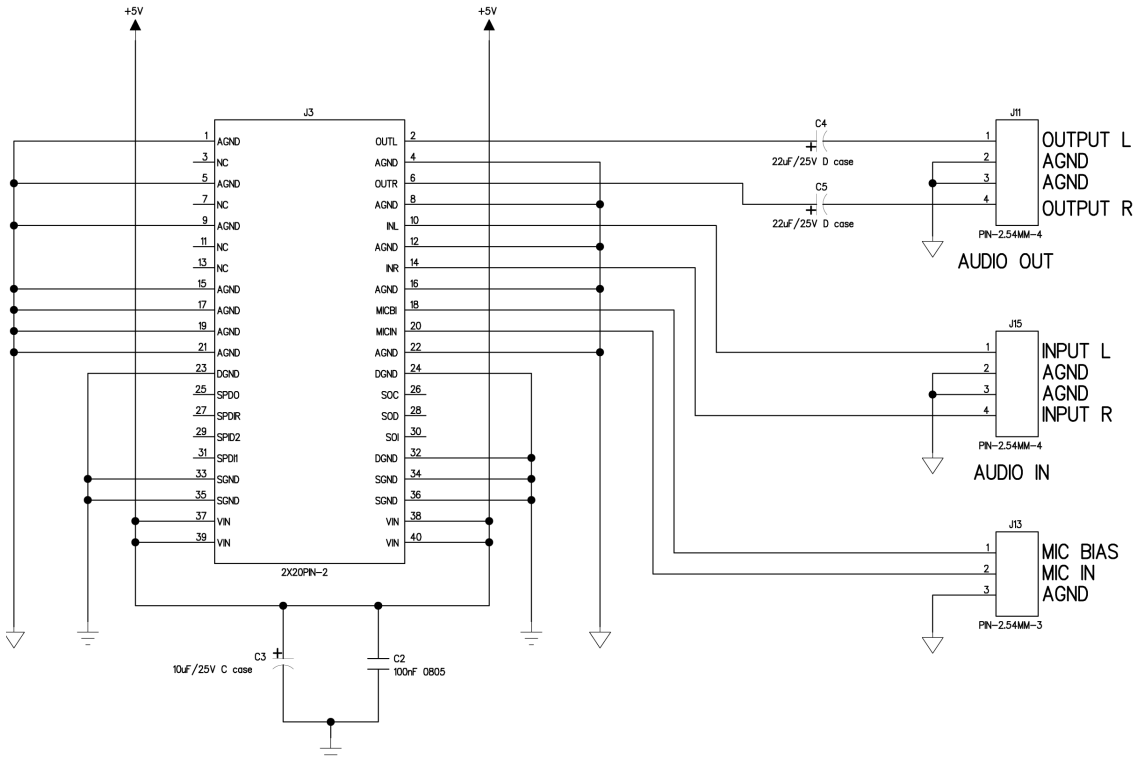
2.4 Analog Audio

Three analog audio interfaces are provided on the board via headers.

- Stereo inputs allows the connection of unbalanced analog audio sources
- Stereo outputs can be used to connect to unbalanced analog amplifiers
- An unbalanced microphone input (with Bias output to power integrated preamp) allows the use of a wide selection of microphones (dynamic, capacitive, FET amplified)

Please note the IP Audio Modules 101 and 102 microphone input signal “MICN” (pin 22 of J3) is connected to the IPAM Carrier PCB's analog ground. In other words: the use of balanced microphones is not supported!

Schematic Audio



2.5 Peripherals

GPIO

Five digital 3.3 VDC general purpose I/Os are available on two header connectors and can be used by OEM software as either input or output. The inputs tolerate 5 VDC Logic Level and outputs supply 3.3 VDC. One I/O pin (J8 pin2) labeled PIO8 is reserved for Soft Reset and can be used to connect a reset button. This button can also be used to revert all settings to factory defaults.

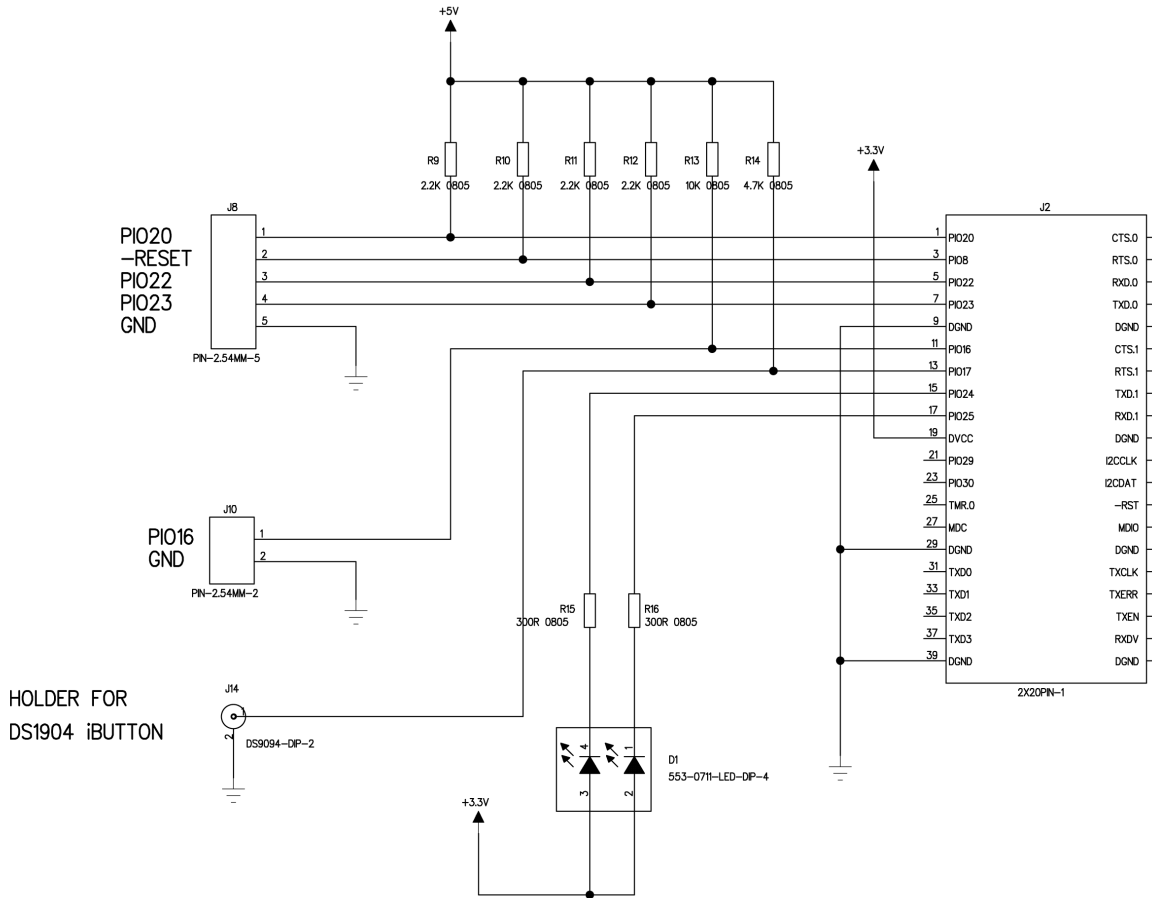
RTC socket

J14 is a holder for a Dallas iButton Real Time Clock chip (DS1904). Supported by custom specific OEM applications the RTC permits absolute time and date information without the need of a network connection to a NTP time server and in cases of power loss.

Status LED's

D2 is a double LED stack with a green and a red LED for status display.

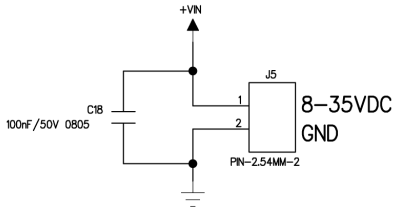
Schematic Peripherals



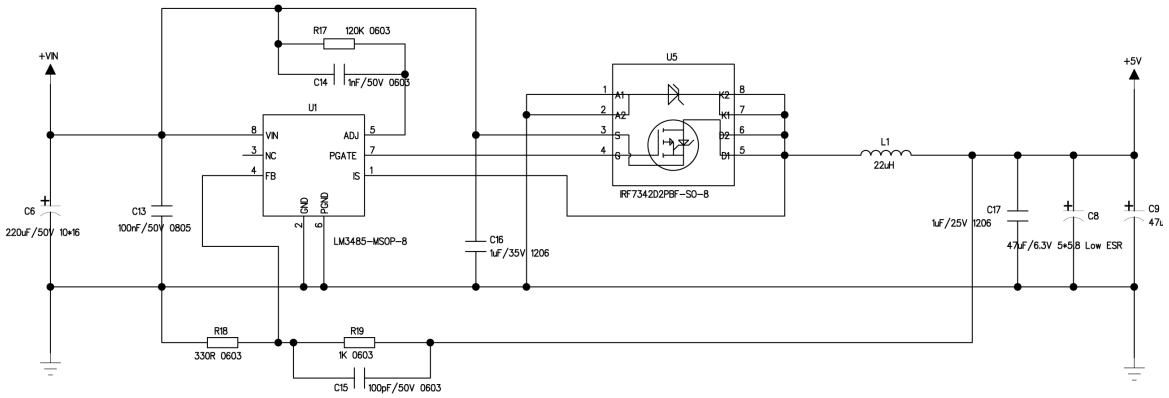
2.6 Power supply input

Two header pins (J5) are provided to power the IPAM Carrier PCB from a single +8 VDC to +35 VDC power source.

Schematic Power Supply Input



Schematic 5V Power Supply



Power consumption

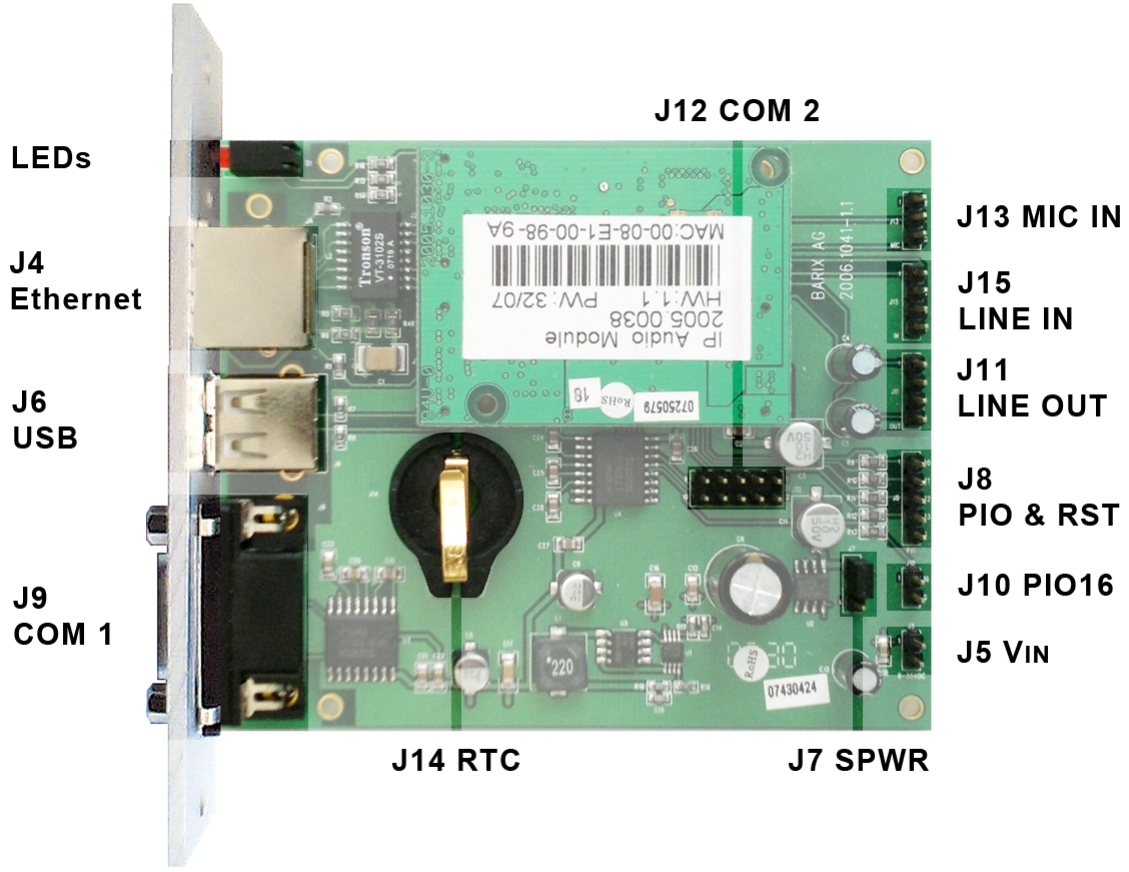
The maximum power consumption is 2.3 Watt for both the Barix Carrier PCB and the Barix IP Audio Module.

Additional power is drawn by a connected USB memory stick. Please refer to chapter USB Interface.

Additional power is drawn by connected devices to the serial ports. Please refer to chapter Serial Interfaces, section SPWR.

3 Connectors

3.1 Connector placement

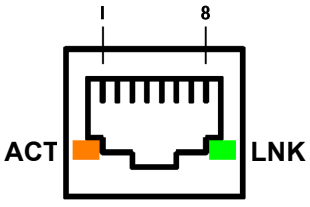


LEDs

The red and the green LED are used for status display.

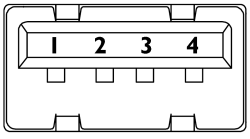
For the status display functionality please refer to the technical documentation of the firmware used.

J4 Ethernet pin out



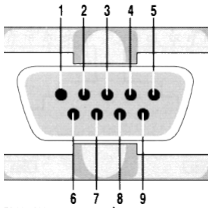
Pin	Description	Pin	Description
1	Speaker -TX+	5	Not connected
2	Speaker +TX-	6	Rx-
3	RX+	7	Not connected
4	Not connected	8	Not connected

J6 USB pin out



Pin	Description	Pin	Description
1	V_{USB} (5VDC)	3	D+
2	D-	4	GND

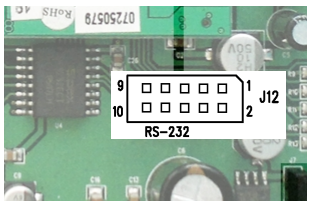
J9 COM 1 pin out



Pin	Description	Pin	Description
1	Not connected	6	Not connected
2	RXD	7	RTS
3	TXD	8	CTS
4	SPWR (see J7)	9	Not connected
5	GND		

For enabling the serial power output SPWR see section “J7 SPWR jumper pin out”.

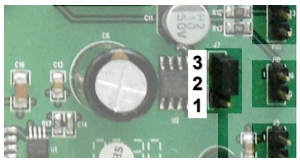
J12 COM 2 pin out



Pin	Description	Pin	Description
1	Not connected	6	CTS
2	Not connected	7	SPWR (see J7)
3	RXD	8	Not connected
4	RTS	9	GND
5	TXD	10	Not connected

For enabling the serial power output SPWR see section “J7 SPWR jumper pin out”.

J7 SPWR jumper pin out

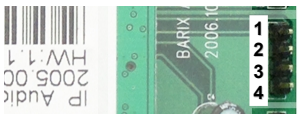


Pin	Jumper	Description
-	No jumper block	No power on SPWR pins
1, 2	Jumper block on lower pins	PWR IN directly connected to SPWR pin on COM1 and COM2 (VIN must meet spec. of attached device)
2, 3	Jumper block on upper pins	Regulated 12VDC to SPWR pin on COM1 and COM2 (VIN >=14V else SPWR=VIN – 2V)

J13 Microphone input pin out

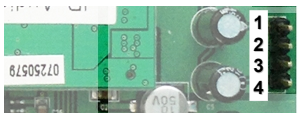
Pin	Label	Description
1	B	BIAS output for microphone preamp
2	I	SPWR (see J7)Microphone input
3	G	AGND Audio Ground

J15 Line audio input pin out



Pin	Label	Description
1	L	Left Audio input
2	G	AGND Audio Ground
3	G	AGND Audio Ground
4	R	Right Audio input

J15 Line audio output pin out



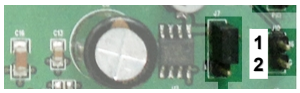
Pin	Label	Description
1	L	Left Audio output
2	G	AGND Audio Ground
3	G	AGND Audio Ground
4	R	Right Audio output

J8 GPIO pin out

Pin	Label	Description
1	20	PIO 20 (e.g. Annuncicom FW: Amp Mute out)*
2	8	PIO 8 RESET button input
3	22	PIO 22 (e.g. Annuncicom FW: **I0** input)*
4	23	PIO 23 (e.g. Annuncicom FW: **I1** input)*
5	G	GND Ground

* The General Purpose IO function (input or output) is defined in the firmware (table shows selection for standard Annuncicom firmware) or in the ABCL application.

J10 GPIO pin out



Pin	Label	Description
1	16	PIO 16 (e.g. Annuncicom FW: Relay drive out)*
2	G	GND Ground

* The General Purpose IO function (input or output) is defined in the firmware (table shows selection for standard Annuncicom firmware) or in the ABCL application.

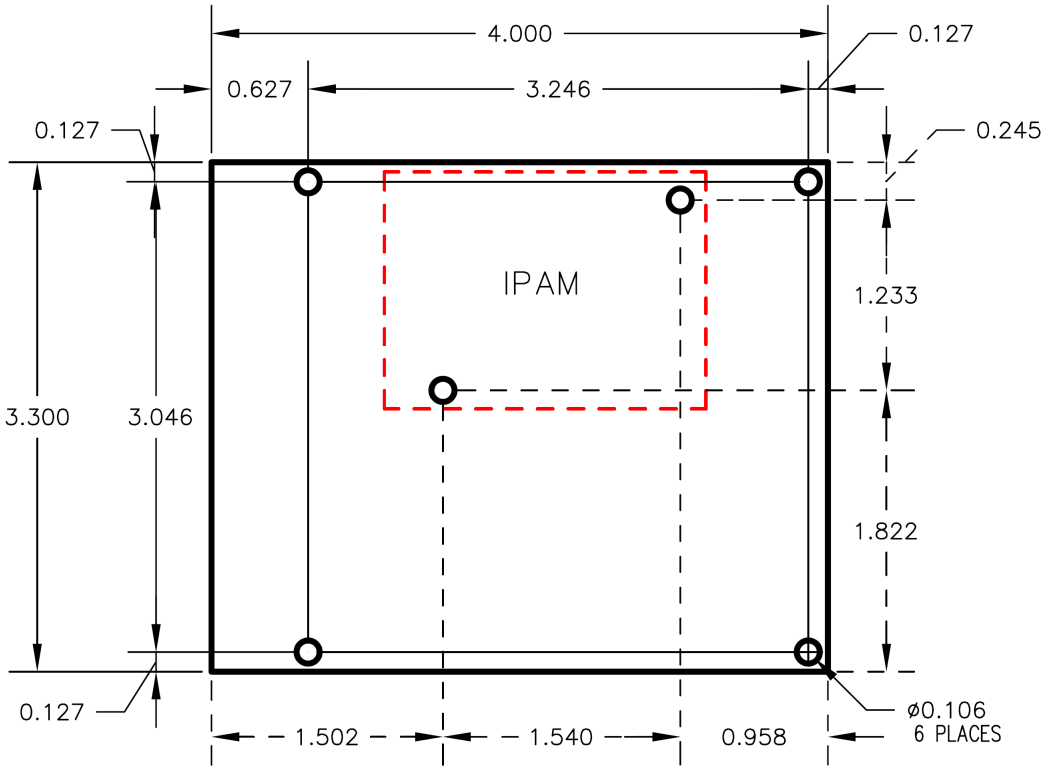
J5 Power input V_{IN} pin out

Pin	Label	Description
1	-	8 to 30VDC (consumption1.6W max)
2	-	GND Ground

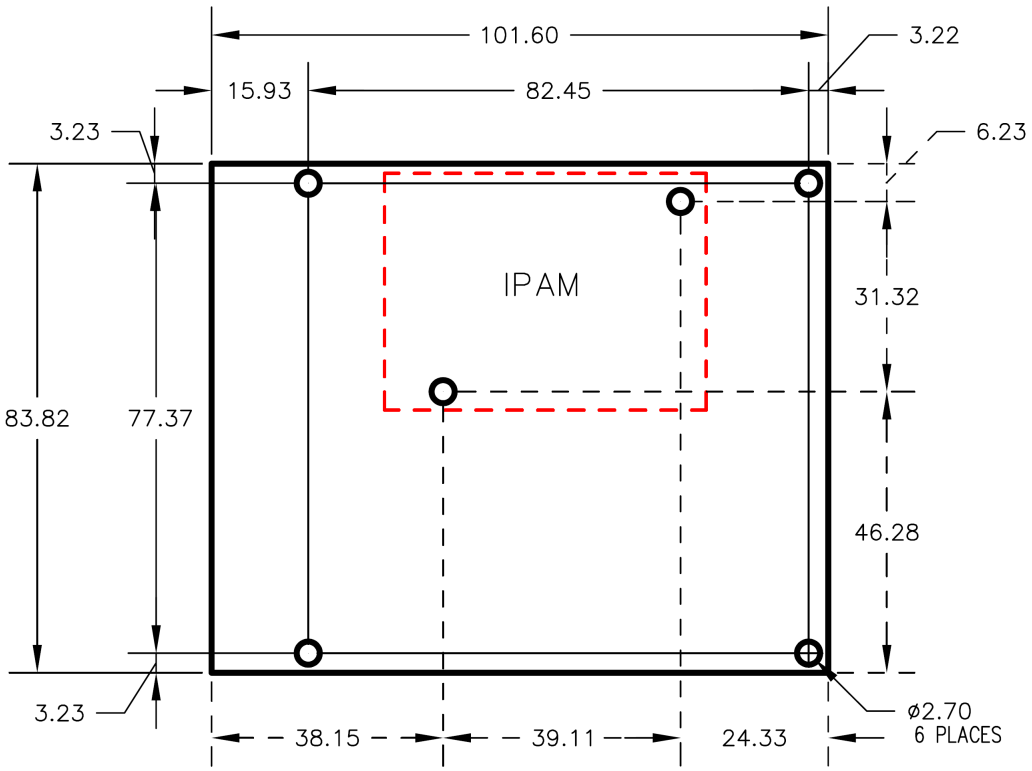
4 Mechanical drawings

The board provides 4 0.106”/2.7mm mounting holes for 0.1”/2.5mm screws for mechanical fixation. The total size of the board only is 4”/101.6mm by 3.3”/83.82mm (+/-0.005”/+/-0.127mm). The thickness of the board is 0.062”/1.5748mm (+/-0.005”/+/-0.127mm). Maximum component height is 0.55”/14mm on the upper side of the board and 0.1”/2.54mm on the lower side of the board, adding up to a total thickness of 0.712”/18mm.

Printed circuit board drawing (US)



Printed circuit board drawing (metric)

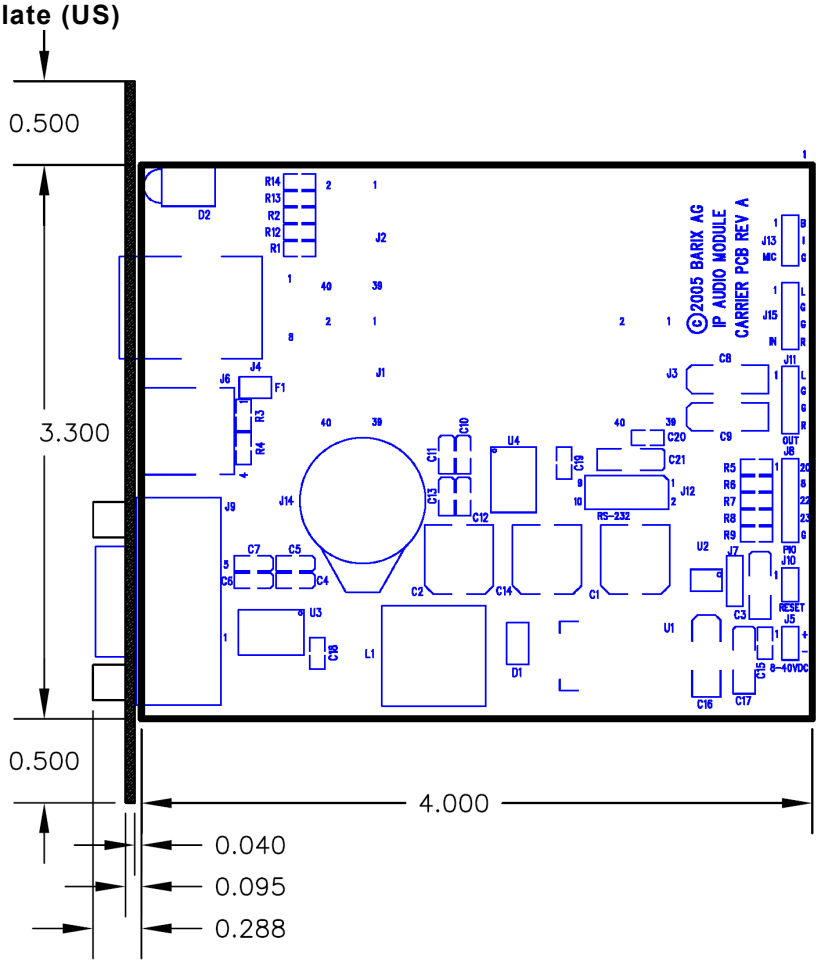


Front plate (US)

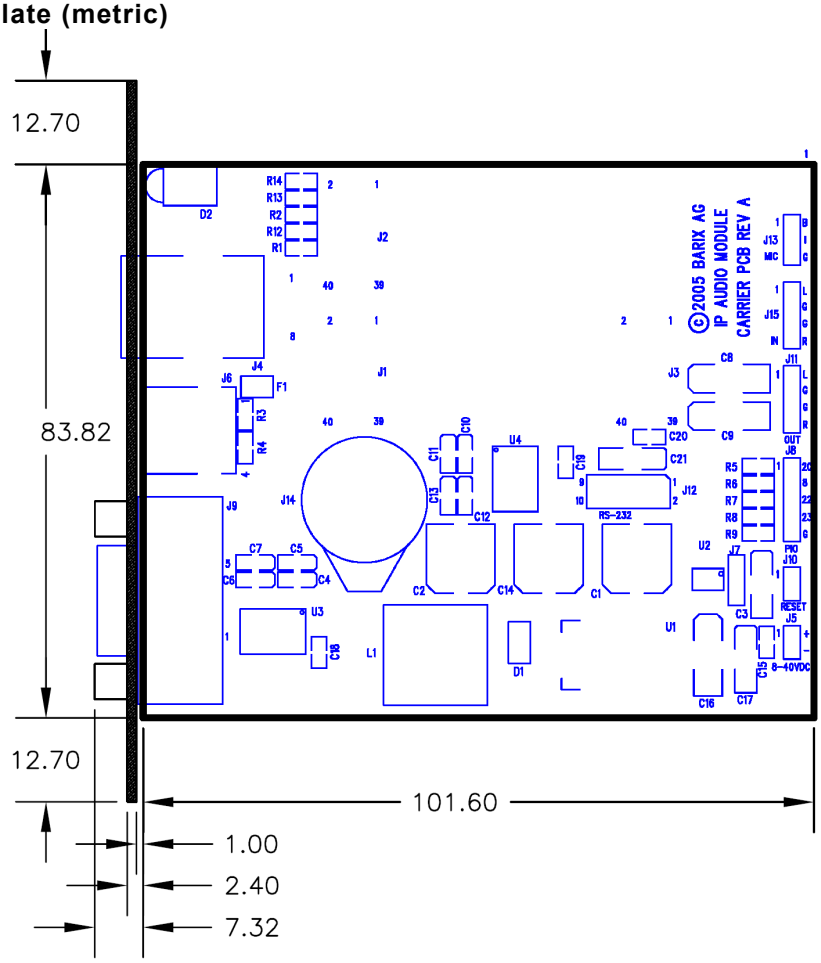
4.1

Front plate (metric)

PCB with front plate (US)



PCB with front plate (metric)



Technical data

Power supply input

Parameter	Min	Max	Unit
Supply voltage (Absolute Maximum Ratings)	8	35.0	VDC
Power consumption Carrier PCB & IPAM		2.3	W
Power consumption USB device (5 VDC)		2.5	W
Power consumption Serial device (SPWR@12 VDC)		3.5	W

Network Interfaces

Parameter	Details
Connector type	RJ-45 female socket
Functionality	10/100 Mbit, full / half duplex, auto negotiation
Status display	Link / Activity LED

Audio Interfaces

Parameter	Details
Connector type	3 pin header (J13), 4 pin header (J15), 4 pin header (J13),
Signals Microphone	Mic Bias, Mic In, AGND
Signals Line In	Line In Left, Line In Right, AGND
Signals Line Out	Line Out Left, Line Out Right, AGND

Serial Interfaces

Parameter	RS-232 COM1	RS-232 COM 2
Connector type	D-Sub 9 pin male (J9)	Internal 10 pin header (J12)
Signals	RxD, TxD, RTS, CTS, SPWR, GND	RxD, TxD, RTS, CTS, SPWR, GND
Power for external devices	12 VDC 100mA max. (self-resetting fuse) or V_{IN}	12 VDC 100mA max. (self-resetting fuse) or V_{IN}

General purpose I/Os

Parameter	Details
Connector type	5 pin (J8) and 2 pin (J10) header
Signals	PIO 8, 16, 20, 22, 23, GND

USB Interface

Parameter	Details
Connector type	USB Type “A” receptacle
Signals	D-, D+, PWR, GND
Power for USB device	short-circuit protection: self-resetting fuse 1.5 Amp, 5 VDC 500 mA max,

Built-in Parts

Parameter	Value	Unit
Green Status LED Current (max.)	6	mA
Red Status LED Current (max.)	7	mA

Dimensions / Mounting / Weight

Parameter	Width	Height	Depth	Unit
Printed circuit board	101.6 4	1.57 0.062	83.82 3.3	mm inch
Front plate	109.22 4.3	1.4 1.85	22.96 0.904	mm inch
Overall dimensions	103 4	19 0.75	84 3.3	mm inch

Mounting

Parameter	mm	inch
Open PCB, with 4 mounting holes	2.7	0.106

Weight

Parameter	gram	oz.
Carrier PCB	2.7	0.095
Front plate	7.0	0.25
IP Audio Module	12.4	0.44
RTC chip DS1904	2.9	0.102

Environmental

Parameter	Value	Unit
Operating Temperature Range	0..55 32..131	° C ° F
Operating Humidity Range (non-condensing)	0..70	%
Storage Temperature Range	0..70 32..158	° C ° F
Storage Humidity Range (non-condensing)	0..70	%

Certifications / Compliances

Type	Certifications/Compliances
Complies with	RoHS, C-Tick

5 Ordering Information

IPAM 100 Evaluation Kit

Barix ordering number **2005.9050**

Package contents:

- IPAM Carrier PCB
- IPAM 100 module

IIPAM 102 Evaluation Kit

Barix ordering number **2011.9114**

Package contents:

- IPAM Carrier PCB
- IPAM 102 module

6 Legal Information

Newest information about our devices is available via download from our website, www.barix.com.

We explicitly reserve the right to change and improve the product without notice.

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