# uC-IOCOM

➤ Intercoms, VoIP, PA Paging

overview

The uC-IOCOM is an installation-ready, board-level platform for IP voice and distributed audio communication including VoIP, intercoms, PA paging and mass notification. The system includes Mbarx-M2M to support applications that require deep supervision or remote operational control by a central host.

The device accepts PoE or 12VDC supply and supports amplified audio output of up to 5W (using PoE) and up to 15W using supply voltage. The board has isolated contacts and loop closures for connectivity to push-buttons, indicators, door controllers or other equipment.

The audio subsystem supports intelligibility and psychoacoustic enhancements including Acoustic Echo Canceller (AEC), Auto Gain Control (AGC), noise reduction and ambient noise compensation.

The uCIOCOM is available as part of a System Solutions engagement packaged with development hardware, direct support, software customization and Mbarx reference code for host integration. The platform is compatible with the Mbarx tools suite including the System Manager maintenance utility and Operations Controller for developing integrated work flow process.

System Solutions engagements help accelerate the creation of specialized voice communications products in buildings, transportation or healthcare environments, including access control, rescue assistance, nurse call and mass notification.
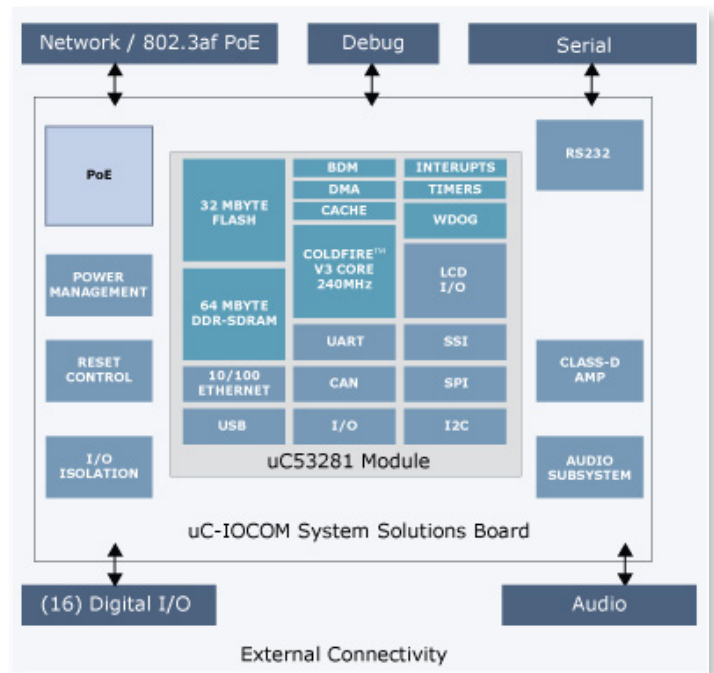
Rugged IP Audio System with Integrated Controls and M2M

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features

- VoIP telephony using SIP and RTP
- Peer-to-peer or SIP server infrastructure modes
- Full Duplex (two-way voice) Calling
- Multicast PA Audio Paging (one way)
- G.711 (toll quality) and optional G.722 wide band
- Eavesdropping mode with remote mic/speaker toggle
- In call operation of volume/gain settings by remote
- Configurable gain controls
- Internal class-D amplifier
- Configurable voice progress announcements
- Support for various microphone types
- DTMF detection via In band or RFC2833
- DSCP settings for SIP and RTP

Intercom Panel Mode

- Device acts like intercom (auto-answer/hangup)
- Power Speaker Output
- PA and Intercom co-existence

PA Paging Receiver Mode (MCPG Rx)

- Listens for and plays multicast audio streams
- Subscribes to up to 100 groups
- Last-in wins support
- Robust PA implementation using keep alive messages
- "Stuck mic" protection
- Transient network protection (pick up and drop)
- Pick up on broadcast in progress

Mulitcast PA Rebroadcaster Mode (MCPG Tx)

- Registers as normal SIP client
- Auto-answers incoming VoIP calls
- Re-transmits VoIP call as MCPG Tx
- Plays audible chime for user

advanced

Intelligibility and Psychoacoustics

- High performance hardware AEC
- 120mS tail length and fast-rate convergence
- Multiband independent NLP and EQ
- Background noise reduction
- Automatic ambient noise compensation

Service Failure, Quality and Reporting

- Loss of telephony registration reporting
- Configurable network monitoring tests and reporting
- Analog audio self-test and reporting
- Analog audio (mic/speaker) test mode for installers
- Call quality (RTCP) packet loss and jitter reporting
- Call quality termination thresholds
- Failover SIP server support
- Automatic failover operation with call re-Invite
- Failover to peer-to-peer
- Call duration and connect trying timers
- System log and remote logging

Configuration

- DHCP or static network configuration
- HTTPS web user interface
- Save/Load configuration file
- Mbarx – System Manager utility for firmware and configuration deployment
- Mbarx M2M Protocol for Supervision/Operation

External Connectivity

- 10/100 Ethernet with MDX/MDO support
- Microphone in (non-bias)
- Microphone in (with bias)
- Line input: 1.55V RMS (configurable)
- Line output: 1.55V RMS (configurable)
- Powered speaker output: up to 4.5W 4/8Ohm (using PoE power)
- up to 10W 4/8Ohm (using direct supply)
- Up to 8 optically isolated loop closure pairs
- Up to 8 optically isolated loop closure detectors
- RS232 serial console (optional) and Telnet

Connector / Integration Options

- I/O - 2ROW32P2ROW32P-100 (or wire to board)
- Network - RJ45 or M12 (female) 2ROW4P2ROW4P-100 (optional or wire to board)
- Audio - 2ROW12P2ROW12P-100 (or wire to board)
- Power - 802.3af - POE powered device (PD) 2ROW10P-100 (optional)
- All signals are duplicated on a PCI-style edge connector
- PCI host board available for development
- DB9 RS232 serial port (optional)

- **COMPLETE BOARD LEVEL HARDWARE SOLUTION**
- **MULTI-MODE VOICE AND VOIP SUPPORT**
- **HARDWARE AEC AND AUDIO PROCESSING**
- **AUTONOMOUS OR SUPERVISED OPERATION**
- **ECO SYSTEM OF TOOLS FOR DEPLOYMENT**

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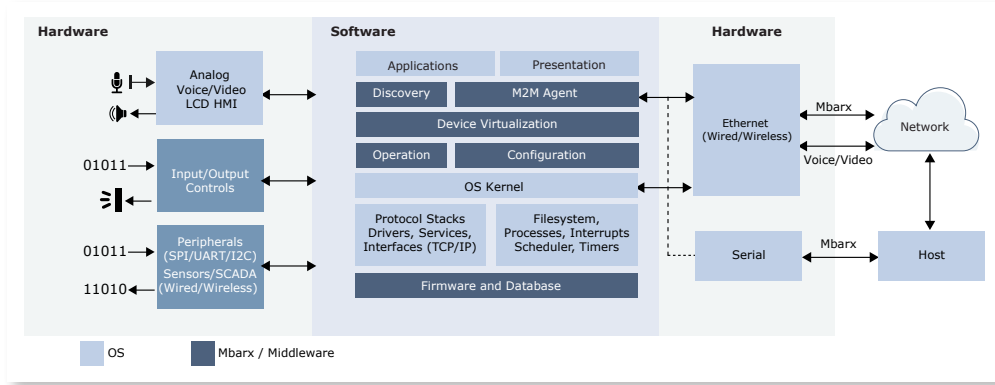
Mbarx

end-points

The core of Mbarx is the end-point resident software. It supports communications between the device and Mbarx host tools. The software is comprised of MDNS device and service discovery combined with an M2M agent that virtualizes the management and operation of the device into a simple protocol with guaranteed delivery over a TCP/IP socket connection.

MDNS advertises the unique device credentials including hardware type, MAC, IPaddress, firmware version, services, operating mode and basic status information. This makes it possible to identify each unique device on the network and associate capabilities and presence by interpreting the service broadcast.

By detecting the unique device credentials Mbarx host tools can connect to the device agent and set or get configuration parameters, push firmware updates, operate or supervise the device. Input events can be monitored remotely and outputs can be controlled. The solution can be extended to add further SCADA (supervisory control and data accquisition) via various interfaces, sensors or services

Capabilities

*   Command and control
*   Events, notifications, alarms
*   Configuration / set and get parameters
*   VoIP call control, audio, voice messages
*   Firmware upgrades

Device and Service Discovery

*   MDNS broadcast
*   Broadcast unique credentials (IPaddress, MAC/OUI, serial num)
*   Broadcast of assignable credentials (location, name, service)
*   Broadcast of firmware and hardware version
*   Broadcast of operating mode or device class

Device Virtualization and M2M Agent

*   Abstracts operation and supervision into a simple M2M protocol
*   TCP based socket interface with guaranteed delivery
*   Supports configuration, supervision and operation
*   Light-weight text based protocol
*   VoIP call control with audio settings
*   Configuration of device parameters and account information
*   Progress, status messages and event notifications
*   Event notifications from external inputs
*   Control of external outputs
*   Host implementation example provided
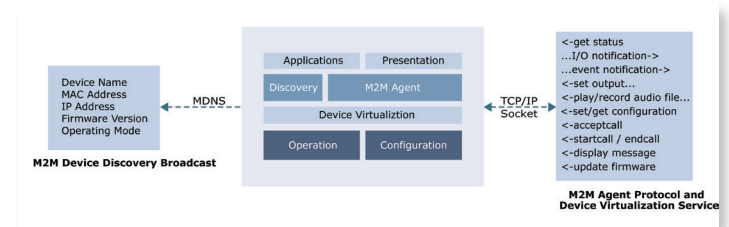
PC tools

Mbarx - Operations Controller is a PC server application for centralized, fixed or mobile operations. It detects and connects to Mbarx end-points and proxies behavior between many devices and many users. The system implements a database back end and HTML5 for front end user presentation. It supports many-to-one and many-to-many models of operation by any combination of PC (Windows® or Mac®) or mobile devices (iPad®, iPhone® Android®).

Supported Platforms:

*   Windows 7, Windows Vista

Mbarx - System Manager is a PC application for site-wide maintenance and monitoring. It discovers devices on the network and identifies unique information including firmware version, services, device types and operating modes. It monitors devices for errors and events and supports single or bulk device configuration through an intuitive graphic interface. An internal software repository helps manage and deploy network-wide firmware upgrades.

Supported Platforms:

*   Windows 7, 7 Starter, Vista, XP, Mac OS

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specification

Signal Name	Description	Signal	Pinout	Connector	Pin
LINE_OUT	Analog Audio	Line Out	A26	CON8	1
L_OUT_GND	Analog Audio	Line Out Ground	B26	CON8	2
MIC_R	Analog Audio	Microphone Right	B27	CON8	4
MIC_L	Analog Audio	Microphone Left	B28	CON8	6
L_IN_GND	Analog Audio	Line Input Ground	A29	CON8	7
SPK_P	Analog Audio	Speaker Output Positive	A30	CON8	9
LINE_IN	Analog Audio	Line Input	B30	CON8	10
SPK_M	Analog Audio	Speaker Output Negative	B31	CON8	11

Signal Name	Description	Signal	Pinout	Connector	Pin
T1_TP_Y	Network	Ethernet Transmit +	A34	CON9	1
T1_TN_O	Network	Ethernet Transmit -	B34	CON9	2
T1_RP_W	Network	Ethernet Receive +	A35	CON9	3
T1_RN_B	Network	Ethernet Receive -	B35	CON9	4

Signal Name	Description	Signal	Pinout	Connector	Pin
	Earth GND	Power	A1	CON6	1
	Earth GND	Power	B1	CON6	2
GND-IN	External Ground Input	Power	A2	CON6	3
GND-IN	External Ground Input	Power	B2	CON6	4
VDC-IN	Power Input	Power	A3	CON6	5
VDC-IN	Power Input	Power	B3	CON6	6
	Contact Closure Ground	Power	A4	CON6	7
	Contact Closure Ground	Power	B4	CON6	8
	+12VDC Output	Power	A5	CON6	9
	+12VDC Output	Power	B5	CON6	10

Virtual IO	IO Function	Description		IOCOM V3.1.1 Pinout	Connector	Pin
1	OUT1	Dry Contact Closure	+ Source Signal	A16	CON 7	17
			- Return Signal	B16	CON 7	18
2	OUT2	Dry Contact Closure	+ Source Signal	A17	CON 7	19
			- Return Signal	B17	CON 7	20
3	OUT3	Dry Contact Closure	+ Source Signal	A18	CON 7	21
			- Return Signal	B18	CON 7	22
4	OUT4	Dry Contact Closure	+ Source Signal	A19	CON 7	23
			- Return Signal	B19	CON 7	24
5	OUT5	Dry Contact Closure	+ Source Signal	A20	CON 7	25
			- Return Signal	B20	CON 7	26
6	OUT6	Dry Contact Closure	+ Source Signal	A21	CON 7	27
			- Return Signal	B21	CON 7	28
7	OUT7	Dry Contact Closure	+ Source Signal	B22	CON 7	29
			- Return Signal	A22	CON 7	30
8	OUT8	Dry Contact Closure	+ Source Signal	B23	CON 7	31
			- Return Signal	A23	CON 7	32

Virtual IO	IO Function	Description		IOCOM V3.1.1 Pinout	Connector	Pin
9	IN1	Dry Contact Closure Detection	+ Source Signal	B8	CON 7	1
			- Return Signal	A8	CON 7	2
10	IN2	Dry Contact Closure Detection	+ Source Signal	B9	CON 7	3
			- Return Signal	A9	CON 7	4
11	IN3	Dry Contact Closure Detection	+ Source Signal	B10	CON 7	5
			- Return Signal	A10	CON 7	6
12	IN4	Dry Contact Closure Detection	+ Source Signal	B11	CON 7	7
			- Return Signal	A11	CON 7	8
13	IN5	Dry Contact Closure Detection	+ Source Signal	B12	CON 7	9
			- Return Signal	A12	CON 7	10
14	RESET	Hardware Reset (*)	+ Source Signal	B13	CON 7	11
			- Return Signal	A13	CON 7	12
15	IN7	Dry Contact Closure Detection	+ Source Signal	B14	CON 7	13
			- Return Signal	A14	CON 7	14
16	IN8	Dry Contact Closure Detection	+ Source Signal	B15	CON 7	15
			- Return Signal	A15	CON 7	16

ratings & parts

Powered Direct (Non- PoE)	Specification
Supply voltage	12VDC (nominal)
Tolerance range	9VDC (min) - 15VDC (max)
Watts	TBD

Voltage Supply	Part	Condition	Consumption
802.3af PoE	uCIOCOM3	Non Power Save	TBD
12VDC	uCIOCOM3	Non Power Save	TBD

Physical	Description
Dimensions (Module)	120mm (l) x 100mm(w)
Operating Range	-40 to +85C
Recommended Enclosure	Hammond Manufacturing 1455 Series

Power Over Ethernet	Specification
PoE type	802.3af (802.3at type 1) 4 Wire
Supply voltage	48VDC
PoE - min. supply power	12.95W (@4.5W Amp Output)

Inputs and Outputs	Specification
Dedicated inputs	(8) - (closure detectors) TVS Suppression (+/- 8kV, IEC 61000-4-2 Level-4)
Dedicated outputs	(8) - loop closure pairs optically isolated - 1.5kV (min) with spark gap

Part Number	Description
EP-SSBP	System Solutions Engagement Package
uCIOCOM3	uCIOCOM System Board Only

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