

IEX16 ADAT Digital Interface



**Movek, LLC
Lab X Technologies, LLC**

**Consulting Agreement /
Proposal**

THIS AGREEMENT is made January 14, 2011

BETWEEN:

**Lab X Technologies, LLC
Lee Minich, President
176 Anderson Avenue, Suite 302
Rochester, NY 14607, USA (“Lab X”)**

AND:

**Movek LLC
6517 Navaho Trail
Edina, MN 55439 (“Movek”)**

Vision and Mission



Vision:

Leading the World in Connectivity Solutions

Mission:

- Lab X is a team of passionate technology leaders dedicated to exceptional product realization. We believe connectivity between products is fundamental to our clients' success, industry growth, and meeting the system level needs of their end customers. When we take on a project, we do so with the belief that connectivity is the backbone that enables our clients to provide unique products which strengthen the industry by enhancing end user systems.
- We partner with our clients to enhance their core competencies with our engineering, design expertise, and product concepts helping our clients develop new products better and faster than they thought possible. We will not compromise designs. We will deliver the highest quality, robust designs with an eye toward future-proofing.
- Our clients are audio (and video) manufacturers who are looking to the future of the industry and develop leading edge products embracing the universal need for connectivity and interoperability.
- Our goal is a commitment to design integrity that translates into higher quality products that last longer while providing system level interoperability to improve our clients' profitability. We work in a transparent environment with our clients so they know as much about their project as we do. We are flexible with our client interactions ranging from a tightly integrated approach augmenting our clients' personnel, to a turnkey process.

Company Overview



- Lab X Technologies, LLC is privately owned engineering design firm expert in connectivity, Digital Signal Processing (DSP), and developing embedded systems solutions for audio applications.
- Lab X was founded by President / Owner Lee Minich in 1996, and partners with manufacturers in the Pro Audio, Commercial Audio, and Home Theater market segments.
- Lab X Technologies is headquartered in Rochester, New York, USA.
- Lab X has extensive expertise in audio network connectivity and in the processing of digital audio. Lab X's breadth of design and implementation capabilities include hardware, firmware / software, gateway, PC based GUI design, and comprehensive project management services.

Proposal Scope

This project is design and implement hardware and FPGA gateway revision to provide a digital interface to the Movek IEX16 Input Expander via adding two ADAT optical interfaces (8 channels each), 16 channels of SRCs (sample rate converters to decouple the myMix network clock domain from the ADAT input rates), and mechanical switches to select / indicate selected source (ADAT or analog inputs) for channels 1-8 and 9-16.

This project scope also includes the modifications to the IEX16 main board PCB to accept the new ADAT digital daughterboard.

Details of the project are captured in the design outline appendix of this proposal.

Design, prototype manufacture, and debug 2 Turns of IEX16 ADAT Digital Interface
Option board

Turn 1 – 5 pieces, 3 to Movek, 1 to remain at Lab X, 1 for potential fallout

Turn 2 – 5 pieces, 4 to Movek, 1 to remain at Lab X

A single turn of IEX16 modified main boards:

Turn 1 – 5 pieces, 3 to Movek, 1 to remain at Lab X, 1 for potential fallout

Deliverables

- Project Management documentation (project plan, project status reports, etc.)
- Manufacturing Documentation:
 - Schematic
 - Bill of Materials
 - PCB files
 - Updated Enclosure Assembly Drawings
 - Production Test (test specification, procedure)
 - Device Programming Artifacts with gateware modifications (Flash image for production, update “blobs” for IEX-16L)
- Custom Production test artifacts (test spec, test programs)

Investment for IEX16 ADAT Digital Interface Option



● Hardware Development	192 hrs
● Gateway Development	27 hrs
● System Level Testing / Integration	48 hrs
● High level design, Project Management	46 hrs

Total Development Effort 312 hrs

Investment for IEX16 ADAT Digital Interface Option (con't.)

- Electrical
 - Turn 1 (5 pieces) \$16,380
 - Daughterboard \$7,040
 - PCB Layout \$ 1,780
 - PCB fabrication \$ 2,000
 - US CM \$ 2,570
 - Parts \$ 470
 - Shipping \$ 220
 - Main Board \$9,340
 - PCB Layout \$ 880
 - PCB fabrication \$ 2,620
 - US CM \$ 3,940
 - Parts \$ 1,680
 - Shipping \$ 220
 - Turn 2 (5 pieces) \$5,710
 - Daughterboard \$5,710
 - PCB Layout \$ 450
 - PCB fabrication \$ 2,000
 - US CM \$ 2,570
 - Parts \$ 470
 - Shipping \$ 220
- Mechanical
 - Turn 1 (5 pieces) \$ 880
- Agency Approval
 - Time and Material + certification costs by Movek

Total Prototype Investment \$22,970

Total Development Investment for myMix Feature Update 1



- Development Labor \$34,320
- Prototype Costs \$22,970
- **Total Development Investment**
\$57,290 USD (Net 30)
-\$ 2,865 USD (14 5% potential discount)

\$54,425 USD (assuming discount)

Time Frame

- The target start date was Monday, January 17, 2011.
- The project will take approximately 12 - 14 weeks to complete, thus estimated completion date of April 11 – April 25, 2011 (assuming US CM).
- If the scope of the work is changed and agreed to by both parties, then the time frame and cost estimates will be reforecast and a new delivery date will be set.

Assumptions and Dependencies



Lab X Technologies, LLC has produced this proposal under the following assumptions and dependencies:

- All costs and pricing is in US Dollars.
- Technical Assumptions:
 - Movek will be responsible for all agency approvals
- Management Assumptions:
 - As of the project start, Movek has designated a single Movek representative as an overall liaison to Lab X for the product duration.
 - As of the project start, Movek has designated a single technical point of contact within Movek for technical issues related to the proposed project (may be the same as above).
 - At project start, Movek will provide electronic access to all source code, schematics, bill of materials, component specification sheets, design documents, and pertinent project management information to perform this body of work.
 - In order to minimize delays, Movek will respond promptly to all issues raised by Lab X during the course of the project. A turn around time of one (1) business day or less is expected for most issues.
 - Movek will provide appropriate platforms and support software in a timely fashion to facilitate Lab X's design, debug, and acceptance testing efforts. Failure to provide such support items may result in the delay of the project completion, or additional time to create "work arounds".
 - If the scope of the work is changed and agreed to by both parties, then the time frame and cost estimates will be reforecast and a new delivery date will be set.
 - Development fees include unlimited domestic telephone calls.
 - Travel expenses are not included within this proposal and shall be charged separately based on actual expenses if necessary.
 - Upon the completion of this project, both Lab X and Movek hereby grant permission to utilize the other entity's name for marketing purposes, although specific project and details may not be disclosed without written consent by both parties.
- This proposal is based upon the phone discussions and email between Josh Bartunek and Christian Glueck of Movek and Lee Minich and Andrew Stevens of Lab X.

Payment Terms

- All payments are in US Dollars.
- A 10% initial deposit of \$5,729 has been waived.
- Development time will be invoiced bi-weekly (every two weeks) as incurred. Prototype costs will be invoiced as incurred.
- Payment terms are 14 5% Net 30 (i.e. 5% discount if paid within 14 days of invoice date) from invoice date.
- This proposal is based on a time and material basis, whereby Lab X Technologies implements our “10% guarantee” – If development costs (excluding authorized change orders) exceed 10% of the projected cost, Movek will not incur subsequent charges to complete the project
- Bank information:

SWIFT CODE: CTZIUS33, Citizens Bank USA
Routing Number: 021313103
Checking Account: 4001300256

Bank Information:
Citizens Bank
800 Paul Road
Rochester, New York 14624, United States
Telephone (585) 247-0900, Contact Holly Ferrari

Qualifications and Acceptance



- Movek agrees that Lab X is acting exclusively in the role as an independent contractor/consultant and assumes no liability on behalf of the Movek or the products that they manufacture and/or sell.
- Movek shall defend, indemnify, and hold Lab X harmless against any and all claims for injury to persons or property arising out of or in connection with the work performed under the agreement by any act or omission of Movek or its agents.

This agreement shall be construed in accordance with and governed by the laws of the State of New York of the United States of America.

Agreed and accepted on behalf of Movek LLC

Signature _____
Name _____
Title _____
Date _____

Agreed and accepted on behalf of Lab X Technologies, LLC.

Signature _____
Name **Lee E. Minich**
Title **President / Member**
Date _____

Movek ADAT Digital Input Option For the Input Expander Project Outline

Revision 1.1
January 7, 2011

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Introduction

In support of a quotation Lab X Technologies is preparing, this document will outline the effort required to meet the objective of a project proposed by Movek. The project is to develop a 16-channel digital input added-on option to the IEX-16L.

Product Features

- Inputs: Two digital audio optical connections conforming to the ADAT™ optical protocol (8 channels of audio per connector).
- Outputs: 8 I2S digital audio data streams going to the IEX-16L main board FPGA.
- User Controls: 2 latching illuminated pushbuttons for selecting between analog inputs and digital inputs in groups of 8 channels.
- Form factor: mezzanine daughterboard that attaches to the IEX-16L main board electrically with a header/receptacle connector arrangement and mechanically on standoffs. Interfaces with the rear panel of the IEX-16L enclosure (optical connectors) and the front panel (selector pushbuttons). Addition of the Digital Audio Input Option will not change the overall dimensions on the IEX-16L enclosure.
- Digital Audio Clocks: ADAT™ clocks to be independent from the IEX-16L/myMix network and from each other.
- Power Supply: will be powered by the IEX-16L main board.
- Agency approvals not affected by addition of digital audio input option add-on.

High Level Task Breakdown

- Hardware Development: Daughter board (Schematic Capture/BOM generation/PCB Layout, 2 spins)
- Mechanical modifications to the IEX-16L enclosure and front panel
- Hardware Development: Main board modifications
- Main board gateway modification
- Build of Prototypes (Daughter boards and Main board)
- Verification of Daughter board operation
- Transfer of manufacturing documents and programming artifacts
- Production test support
- Agency Testing

Lab X Deliverables

- Project Management documentation (project plan, project status reports, etc.)
- Manufacturing Documentation:
 - Schematic
 - Bill of Materials
 - PCB files
 - Updated Enclosure Assembly Drawings
 - Production Test (test specification, procedure)
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- Custom Production test artifacts (test spec, test programs)

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- Agency Conformance certification

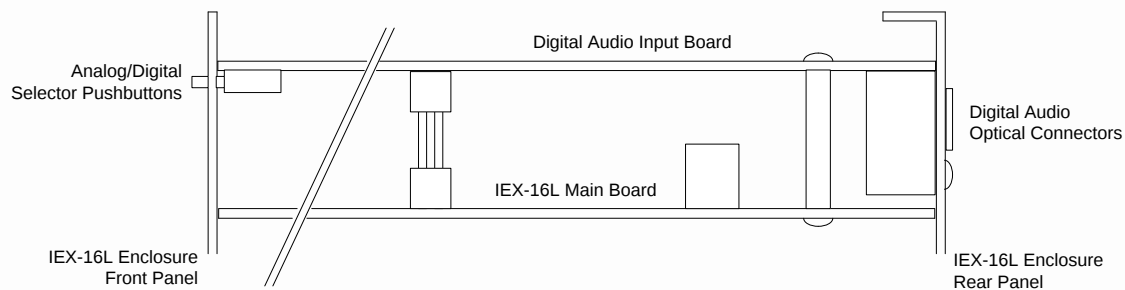
Movek's Responsibilities

- Review of documents
- Development of the unit's enclosure screen printing and labeling.
- Acceptance Testing
- Interfacing with custom manufacturer

Design Discussion

Hardware

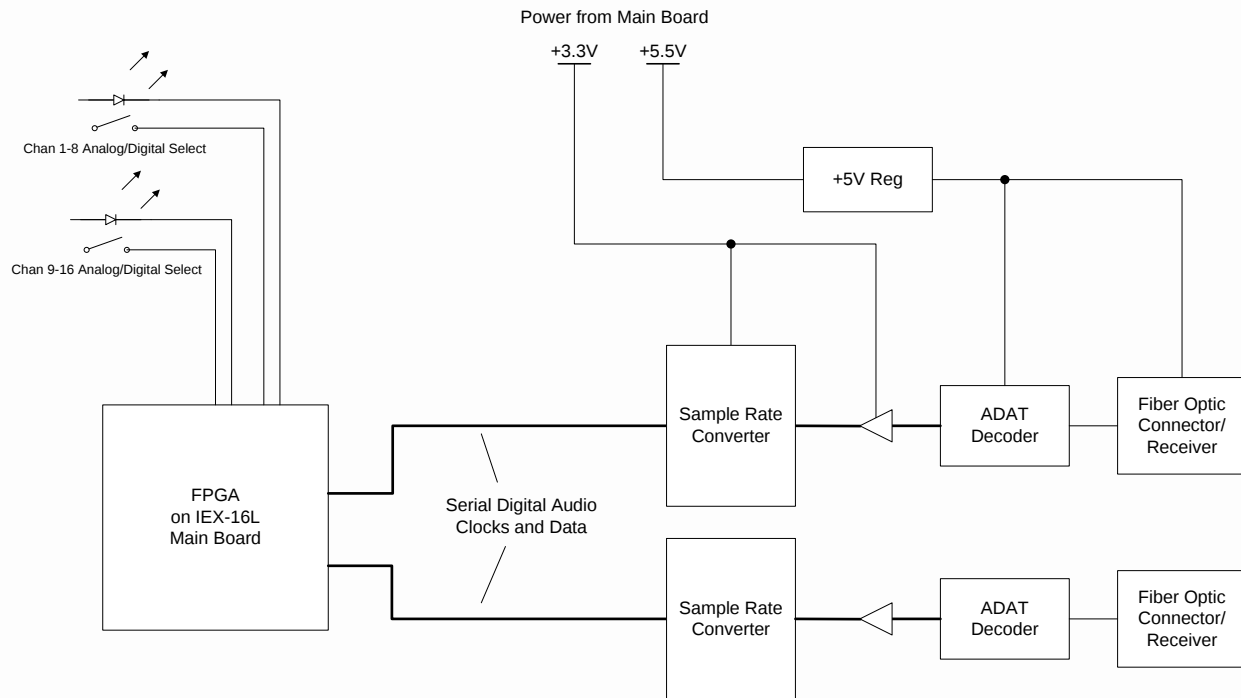
The digital audio input circuitry will be put on a daughter board that will mount over top of the IEX-16L main board with its component side down. The digital audio input board's external interfaces, which are the optical connectors and the audio source selector pushbuttons, are mounted on the daughter board and go through the front and rear panels. The board is mounted to the main board with standoffs, and has a connector for electrical connection to the main board. See the diagram below.



Digital Audio Input Hardware Block Diagram

The electrical design is pretty straight forward, as diagramed below. A pair of ADAT decoder chips translates the optical data stream from the receivers into I2S serial streams, and sample rate converters isolate the ADAT audio clocks from the IEX-16L/myMix audio network time domain. The sample rate converters are in a fixed configuration, and the input and output ports are in slave mode. Multi-channel converters are being used to save on space and cost.

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Digital Audio Input Design Block Diagram

Main board Modifications

Modifications to the IEX-16L main board would be the addition of the daughter board connector and adding the new signals to the FPGA (audio clocks and data, audio source selector pushbutton support). Modifications to the gateway to select either the analog inputs or the digital inputs would be done, as well. It is believed that the internal power system of the IEX-16L will handle the addition load presented by the digital audio input board, and this will be verified in the design phase of this project.

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