



Get Dense, Save Money

Edge QAM Lowers Total Cost of Ownership

Liquid X stream

Operator Case Study Details Savings

Dense Edge QAMs Generate Savings For Cable Operator



The ultra-dense LxS-3616 supports 576 QAMs per chassis and 36 QAMs per port.

Cable operators face a dilemma. Customer demand for new services like HDTV, “start over” and “look back” video features, and DOCSIS 3.0 data is insatiable. Yet these new services consume network resources nearly as fast as switched digital video (SDV) makes them available. How can operators continue to add these powerful competitive differentiators in an economic climate where dollars are tight and pressure to cut costs is intense?

LiquidStream’s LxS-3616 Universal Edge QAM provides a solution. This ultra-dense edge QAM supports 576 QAMs per chassis and an industry-leading 36 QAMs per port. It enables cable operators to cost-effectively accommodate rapid service growth and improve the environmental impact of their hubs. Plus, the LxS-3616 dramatically lowers the total cost of ownership at the edge, with savings increasing as QAMs per port increase. Operators save money related to:

- Power consumption
- HVAC, backup power and generator capacity
- Routing and Ethernet connectivity
- RF wiring, combining and rack space
- Installation and maintenance costs

How dramatic are these savings? The LxS-3616 could save enough to pay for the incremental QAMs. We explain how in the real-life analysis that follows.

Suburban Hub Gets Dense

A large, North American cable operator needed to upgrade the SDV system in one of its suburban hubs. The hub provided 80 service groups with 12 QAMs for SDV and 4 QAMs for video on demand. The operator needed to add another 4 QAMs for SDV to free bandwidth for new services, which brings the total to 20 QAMs per service group or 1,600 QAMs for the hub.

LxS-3616’s Operational Cost Savings

Area of Savings	Impact	Amount Saved
Power consumption	Reduced energy costs, lower power consumption	\$22,463 per year
HVAC, UPS backup, generator, hub powering	Improved HVAC efficiency, increased generator capacity	\$73,000 up front
Ethernet connections	20x fewer connections	\$7,300
Coax connections and combiners	5x fewer connections	\$6,400
Hub switches and routers	Greater routing capacity per hub	Site specific
Installation cost savings	Fewer truck rolls	\$23,000
Rack space	Will vary by hub	Site specific

Total 5-year costs for existing QAMs is \$320,860 vs. \$76,720 for the LxS-3616, which yields a 5-year NPV savings of \$162,895.

Its existing edge QAM deployment suffered from several shortcomings. The solution lacked density, consumed a lot of power, was complicated to install, and expensive to upgrade. By replacing 80 low-density boxes with five ultra-dense LxS-3616s, LiquidStream solved all of these problems while delivering substantial, measurable operational savings.

Power Consumption Lowered

Volatile energy prices and pressure to be “green” make reducing ongoing power consumption a business imperative for cable operators. Fully loaded, the LxS-3616 consumes just 25 percent of the power of the legacy units deployed at this hub. When powering 20 QAMs per service group at this one hub, the high-density platform saves:

- \$4.30 per QAM per year
- \$22,463 per year (existing QAM power cost: \$34,579; LxS-3616: \$12,117 annually)

Savings are based on the electricity rates for this system.

Cooling Costs Eliminated

The LxS-3616’s low power requirement positively impacts more than just energy costs. In this system, the hub’s HVAC equipment was operating at 86 percent capacity before the upgrade. If the operator were to add the new QAMs with its existing devices, it would need a \$10,000, four-ton HVAC upgrade. The LxS-3616 eliminates both the capital expense of a new cooling system and the ongoing expenses to power it.

Similarly, the LxS-3616’s efficient power use translates to a need for less backup power. In our example, the hub’s backup power supplies were at 80 percent capacity before the addition of the new QAMs. In anticipation of the upgrade, the operator had recently installed an \$18,000 15 kVA backup unit. Deploying the LxS-3616 enables the operator to move that power supply to another hub.

The MSO achieves similar operational savings related to generators. Again, the hub’s generators were maxed out at 98 percent capacity before the new QAMs. A \$45,000, 400-amp generator would have been required. Due to the LxS-3616’s power savings, generator load is down to 80 percent *after* the four QAM addition.

Ethernet Connectivity Simplified

LiquidStream’s ultra-dense edge QAMs also dramatically lower the number of optical Ethernet connections needed. The hub’s existing QAM equipment required 200 1 GigE interfaces — a wiring nightmare. The LxS-3616 provides the operator with two dramatically simplified Ethernet connectivity options:

- Five 10 GigE interfaces plus five 1 GigE links for management — a twentyfold reduction
- Thirty 1 GigE links (rather than 200) — a sixfold decrease

Both solutions radically simplify the wiring complexity and management of the existing system (see photo at right), and they result in a \$7,300 savings at this hub. Savings accrue from fewer GigE cables, reduced router input ports and lower installation costs.

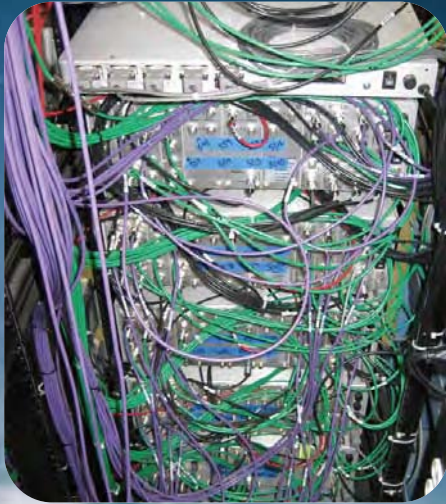
The LxS-3616’s internal switching and multicasting abilities also help operators reduce hub routing requirements. Savings vary and depend on whether the existing switches and routers at the hub site are fully loaded.

Existing Ethernet Connections



The LxS-3616 simplifies optical connectivity. Shown here are 160 GigE connections on the switch required to feed the existing QAM technology.

Existing Coax Connections



Coax wiring is already out of control, before the upgrade has occurred.

Coax Wiring Reduced

The platform's wiring benefits also extend to coax connections and combining networks. In this hub, LiquidxStream's high-density platform allows the operator to reduce the number of coax cables from 400 to 80 — a fivefold improvement. Additionally, the LxS-3616 completely eliminates the need for narrowcast combining networks. These two improvements result in a \$6,400 savings and greatly lower the operator's cost and time to increase the number of QAMs per serving area.

The high-density edge QAM solves another problem. Because the hub was upgrading from 16 to 20 QAMs per service group, the existing four-way combiners would have had to be replaced with eight-way combiners. With the LxS-3616, the operator no longer needs to purchase this new equipment.

Wiring requirements for future upgrades are also reduced. The existing low-density system would have required one more coax connector for every four QAMs added per service group. Yet RF wiring at this hub is already a complex tangle of wires (see photo at left). The LxS-3616 requires no additional RF connections until the service group is populated with 36 QAMs.

The LxS-3616's high density translates into smaller rack space requirements, as well. Operators typically need four times less rack space to house the LxS-3616 than competing solutions. In space-constrained hubs, this smaller footprint is a significant advantage.

Installation and Maintenance Streamlined

Operators deploying the LxS-3616 see substantial improvements in installation time and ongoing maintenance. These improvements directly translate into operational savings. Because the high-density solution requires fewer boxes, labor costs for initial installation are significantly reduced. In this hub, five LxS-3616s replace 80 low-density devices.

The edge QAM's high density provides another benefit: future upgrades are free. Once the 36 QAMs are installed on each port, an operations technician can turn up new QAMs anywhere in the network whenever they are needed. The operator doesn't have to roll trucks to all of its hubs, rather a technician can activate new QAMs from one central location.

What had previously taken weeks of truck rolls that disrupted service and delayed revenues can now be done in minutes. At this hub, we estimate that two future upgrades, occurring in year two and year four, would yield a net present value (NPV) of roughly \$23,000.

\$163,000 Savings Achieved

Using a cost of capital of 20 percent, deploying the LxS-3616s in this one hub yields the cable operator a savings of at least \$163,000 NPV over the next five years. Dollars saved from lower energy costs, reduced cooling requirements, simplified Ethernet and RF wiring, and streamlined installation and maintenance yield sufficient operational savings to pay for the four-QAM-per-service-group upgrade.

Savings in your application is contingent upon the existing power, HVAC, and space capacity of your hub and the electricity rates in your area. LiquidxStream can help you calculate these savings for your system. Contact us today to analyze the operational savings potential available from your hubs.

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