

ELECTROLINE

ELECTROLINE EQUIPMENT INC.

**Increasing Subscribers & Improving
Profitability with Addressable Taps**

- a white paper

Increasing Subscribers and Improving Profitability Using Addressable Taps

- Introduction:

Addressable tap technology can be the source of great improvement in cable companies' revenues and in lowering their operating costs. Whether deployed throughout a system or in selected areas, addressable taps provide numerous benefits such as the conversion of unauthorized connections to subscribers, the control of subscriber status, a reduction in truck rolls, simplified access to difficult areas, control of analog channels in an analog/digital system, ingress reduction, and support for marketing efforts. In addition, it is a great tool to reduce delinquent accounts and to improve cash flow.

- Conventional Subscriber Control: A Time Consuming, Error Prone, and Costly Method

With the conventional method of subscriber control, cable operators control services by physically connecting or disconnecting drop cables. However, displacing a truck and using a highly trained technician to physically service a subscriber is costly and inefficient. For instance, during a service call to make a connection, a technician's time can be mostly spent waiting for access into a home. Even more so, when work is to be performed in a multi-dwelling unit, the service call may further be complicated by having to rely on the building's superintendent to provide access. It often takes several days and truck rolls before the service is finally provided. This method of subscriber service management wastes resources and can translate into lost revenues from time spent on service calls and the possible loss of subscribers from poor service response times.

In some cable systems, a large number of unauthorized connections are caused by disconnection errors. As much as 10% of homes passed are receiving unauthorized cable services. This problem has been marginally regulated by deploying increased physical security using a barrier against tampering such as a stronger equipment lock box. These errors are also the cause of revenue loss, going unnoticed for several years until a system audit is performed or a service call is answered.

To stay competitive in today's market, cable operators are required to find better ways to maximize their subscriber base, to reduce operating costs, and to efficiently utilize technical staff.

- The Solution: Automated Connections and Disconnections Using Addressable Tap Technology

Addressable taps and splitters are designed to automate the expensive and time-consuming process of managing subscriber status'. When a change in customer service is made in an operator's billing system, the addressable port in the field is switched within seconds to the appropriate service. The billing system can also immediately deactivate service when an account is past due or it can activate service on a specific date for subscribers move from one location to another.

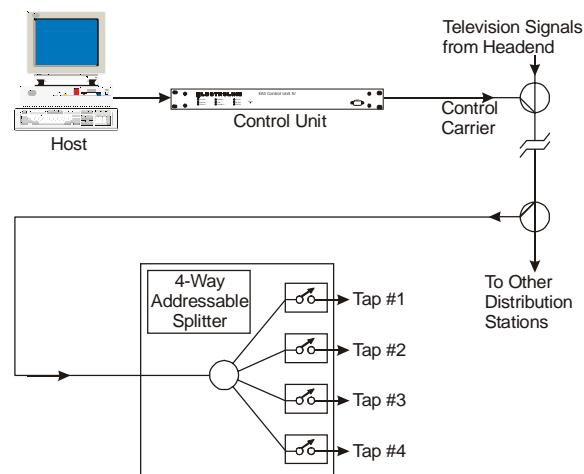


Image 1: A diagram of a typical cable system deploying addressable technology

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An off-premise addressable system consists of a control unit that resides at the headend with addressable taps and splitters installed in the field. The control unit stores the status for every subscriber port and continually updates the equipment in the field. When a subscriber's status needs to be changed in the billing system, the information is updated in the control unit and the addressable taps are immediately switched to reflect the change. This information is stored in a non-volatile memory within the control unit and it is continually transmitted to the taps out in the field, keeping them up to date.

The billing system stores street addresses with its corresponding addressable port. If a particular address becomes a subscriber, its corresponding addressable port will be switched to the "ON" position. The address is switched to the "OFF" position for non-subscribers. When a subscriber moves, the billing system automatically switches to the "OFF" position at the unoccupied address and is activated at the subscriber's new address.

- Addressable Technologies:

1. One Tier Addressable Technology:

A one tier, or On/Off addressable tap or splitter can be considered similar to a traditional tap or splitter with the exception that it includes a computer-controlled RF relay at each subscriber port. The relays are instructed to pass or block the 5 MHz to 1 GHz band depending on the status sent from the control unit in the headend. When a relay is switched to "ON", the entire spectrum is passed to the subscriber's drop cable. When the relay is switched to "OFF", the RF signals are internally terminated with a 75Ω load, providing a better impedance match than to simply disconnect a drop cable. This switches all forward signals to "OFF" to the output port and blocks ingress from entering through the port. Drop connectors are permanently attached to the ports, further reducing the probability of faulty connections that can lead to leakage or ingress. Latching relays are used in all addressable equipment to eliminate unnecessary power consumption.

The ability to disconnect and terminate a signal using the tap's internal relays provides a significant increase in system security since simply attaching a drop cable to an unused port will not give service.

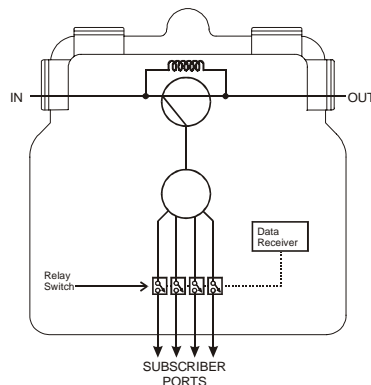


Image 2: One Tier Addressable Tap

2. Two-Tier Addressable Technology:

Two-tier addressable taps provide control of basic and extended service in the tap. In a two-tier tap, the input signal is split to form two services. One leg of the split is passed through a trap or a filter to create the basic service, while the other leg remains unfiltered. A set of two relays at each subscriber port selects either the basic or extended service. A single tiering filter (i.e. one filter) is shared by all subscriber ports, providing considerable savings for large splitter panels. Considerable benefits can be acquired when implementing two-tier equipment; truck rolls are

Increasing Subscribers and Improving Profitability Using Addressable Taps

saved on connections or disconnections, and on service upgrades or downgrades. Two-tier addressable taps control extended basic channels without using an addressable set-top box, thereby allowing cable companies to reduce their stocking quantities.

A two-tier system can also be used to control access to the return band and to reduce ingress. By using a high pass filter instead of a channel trap, basic service only passes forward signals, while extended service passes forward and return signals. If a customer subscribes to a two-way service such as cable modem, the billing system can automatically permit access to the return path. Subscribers receiving the standard services are isolated from the return path so that they cannot inject ingress from their home into the distribution network.

Off-premise addressable equipment is transparent to the signals passing through it. Since this equipment only switches signals "ON" or "OFF", it is compatible with any digital or analog signal format.

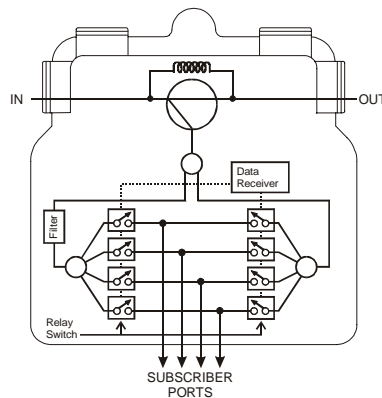


Image 3: Two-Tier Addressable Tap

- The Advantages of Implementing Addressable Taps in a Cable Network:

1. The Conversion of Unauthorized Connections into Subscribers

Addressable systems perform continuous audits that switch "OFF" all unauthorized connections. This is possible since all of the drop cables, including those without service, are permanently attached to ports on the addressable tap. Services can no longer be stolen by simply connecting a loose drop cable or by removing an obvious security device. Tampering with a neighbor's active drop automatically becomes obvious to the operator and the service can be quickly disconnected. With this system, the only way to receive access is by officially becoming a subscriber. Results from major MSO's have shown that this type of system can convert more than 50% of unauthorized subscribers into paying customers.

2. Immediate and Accurate Control of Subscriber Status

An addressable system provides operators with direct access to subscriber service accounts through its billing system. It allows delinquent subscribers to be automatically switched "OFF" and then reconnected when their accounts are paid. This translates into improved cash flow through a reduction in accounts receivable. Operators can reconnect their subscribers within minutes, saving time and money on two truck rolls per service call: one to disconnect and one to reconnect. The system also prevents technicians from having direct contact with subscribers during a service call to disconnect or to collect service fees.

With this type of control system, a subscriber can be connected upon request and the billing is immediate which is a convenience for both the customer and the operator. Subscribers receive the unscrambled analog channels immediately and can then arrange to pick up their set-top box or have it installed at their convenience.

3. Truck Roll Reduction

The reduction in truck rolls to connect or disconnect a subscriber is another important advantage when adopting an addressable system. With this type of system, skilled and expensive technicians are able to service more customers in a lot less time.

4. Simplifying Servicing of Difficult Access Areas

Some service areas can be difficult to access. For instance, areas with restricted parking, high security buildings requiring the supervision of an attendant, or areas where rear easements force technicians to access backyard taps through a neighbor's property. With addressable off-premise management, these difficult access areas are no longer an issue.

5. Addressable Taps and Digital TV

Addressable taps are, and will remain, a vital tool even when digital set-top boxes become highly popular. While digital set-top boxes can control every digital channel, connections and disconnections are still required to control analog channels or other non-encoded signals. Cable operators have a competitive advantage over other providers of digital TV service since they can provide a full range of signals for a second TV set or VCR, without the use of a set-top box.

6. Ingress Reduction Through Control of the Return Path

Addressable taps eliminate ingress from all unused drops and tap ports by terminating the tap port internally.

A two-tier system can also be used to control access to the return band and to reduce ingress. If a high pass filter is installed instead of a channel trap, basic service can be used to pass only forward signals, while extended service passes forward and return signals. If a customer subscribes to a two-way service such as cable modem, the billing system will automatically permit access to the return path. Subscribers receiving the standard services are isolated from the return path so that they cannot inject ingress from their home into the distribution network.

7. Revenue Increase Through Targeted Promotion

Potential customers can be given free service for a short trial period, enticing them to become subscribers. Service can also be offered on a daily or weekly basis to seasonal customers that are unwilling to pay a renewal fee for cable service. A test performed in a major cable system demonstrated increased penetration by an average of 4 % in areas where addressable taps were implemented.

- Conclusion: Addressable Taps Provide an Excellent Return on Investment

There is an initial capital expense to deploy addressable taps in a cable system. Historical performance has proved that there is an increase in subscriber-base when deploying addressable systems. The elimination of unauthorized connections and the reduction in operating costs can cover capital expenditures in less than two years. In fact, addressable taps have been rated by major MSO's as being an excellent investment in CATV, far exceeding the returns on investment of system acquisitions and rebuilds, or even the expected returns on digital services.

Electroline offers a free payback analysis software for implementing addressable systems in a cable network. It is available at www.electrolinequip.com

To find out more about the advantages of deploying addressable taps in modern cable networks, contact you may contact:

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