

VALUE SAVING SYSTEM UPGRADES

INTRODUCTION

The growth of the subscribers' need for bandwidth on a CATV system justifies sooner or later the upgrade of the network. This upgrade can concern the forward path bandwidth and/or the return path bandwidth depending on that downstream, upstream or both data speed should be improved. In many cases such an upgrade - if it means purchasing new active elements - brings basically too large investment correlated to the benefits. The first cause of it can be that the system working time since the startup have not reached the value determined in the payback plan. The second cause can be that the improvement doesn't result enough new subscribers to make the investment economical. The same considerations can be taken in case of optical nodes, where i.e. only the return path laser should be changed with a CWDM or higher power type. An intermediate solution between using the unchanged system and changing all the active devices is needed, that causes affordable costs.

THE TECHNICAL BASIS

The bandwidth values of a common modular CATV network entity are limited only by a few elements, such as diplex filters, EQ modules, amplitude correctors, active stages and eventually the RF port circuits. The other components have lower or no influence on this parameter: The housing as cavity has in general high enough resonance frequency not to hinder the upgrade, as well as the basic circuitry of the motherboard, the ingress switch, the switching mode power supply and so on can be used in the future without modification (see figure 1).

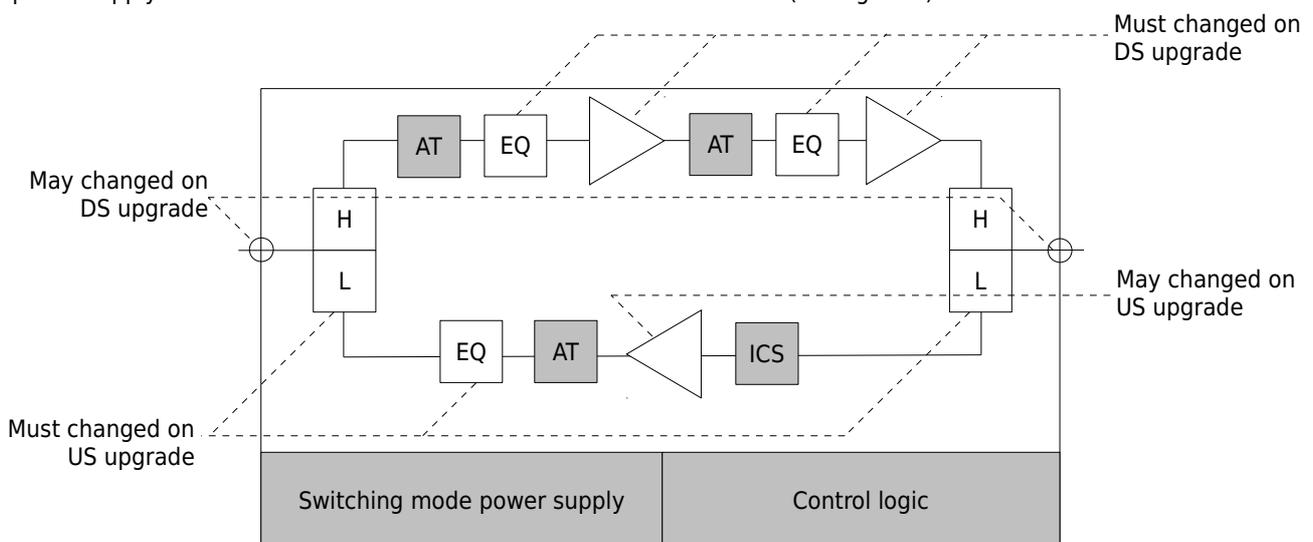


Figure 1

BENEFITS

A very significant part of a new network element's price is the die cast housing, the power supply unit, the control logic and the largest area PCB. In case of element upgrade instead of purchasing a new element the cost of these are eliminated. Commonly the exchangeable modules and the active stages must be replaced. In the modular style devices hybride components are mounted, the work on them hasn't got high expenses and doesn't need a long time. The same advantages has the upgrading of the laser elements in an optical node instead of device change. If the network consists of elements with exchangeable tray, the operator's upgrade work can be done without any cable mounting, since the shell is not needed for this. All these facts draw that **CAPEX is about 70 percent lower** than in case of purchasing and mounting a low-cost but new element set.

The group of activities on the devices can be composed flexible. The upgrading in forward and/or return path direction is basic, where the customer decides whether GaAs or GaN active stages are used. Above this also **repairment** and PSU **refurbishment** are possible. The latter is strongly recommended if the devices were in service since more years - the continuous work and the high environment temperature make high demands on electrolytic capacitors, so they should be replaced.

Comtech undertakes to realize all these changes, including the first feasibility measurements, development of the needed new modules and realization of the rebuilding. The related support is very similar to the services provided with a brand new device: After the upgrade of an individual element **one year warranty** is available for it's affected parts, and after the upgrade of a type the affected **module set is (re)orderable** in the future i.e. for releveling.

Up to this point more types of Antec, Harmonic and Motorola amplifiers have been upgraded from the bandwidth side, Vector nodes were upgraded from the bandwidth and laser side, as well as a whole module set (including the active return path module contained the breakpoint-determining filters) was developed for the Kathrein VGF series.

A special upgrade is **adding extra features** to the existing network elements. This means developing customized modules for OEM devices. Arousing thoughts here are some examples: return path optical transmitter with integrated switchable pilot generator, AGC controller or high pass filter in JXP style.

A very important feature is the **element management** to achieve the desirable service quality. Supporting this Comtech develops on demand monitoring transponders as well as return path ingress controllers for existing devices to upgrade them. Modules for different C-COR, Cisco, Harmonic, Kathrein and Motorola types are already realized.

CONCLUSION

Upgrading a network by using the Comtech solution for rebuilding the existing OEM network elements ensures the same benefits as buying brand new devices (provides the desired bandwidth, extra parameters and warranty), but the costs are only a fraction of the expenses of a device change.