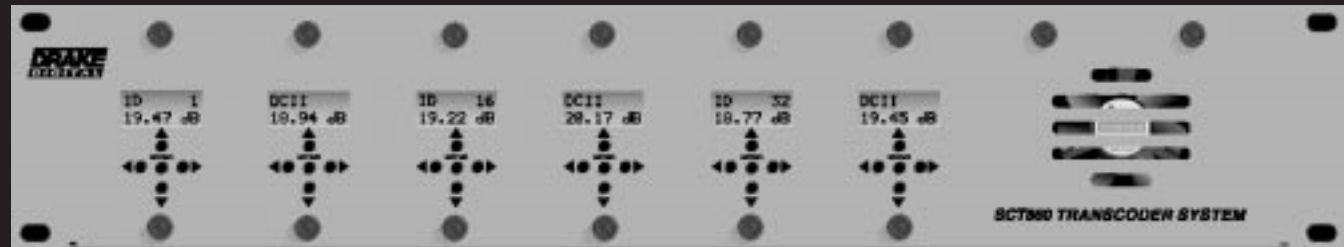


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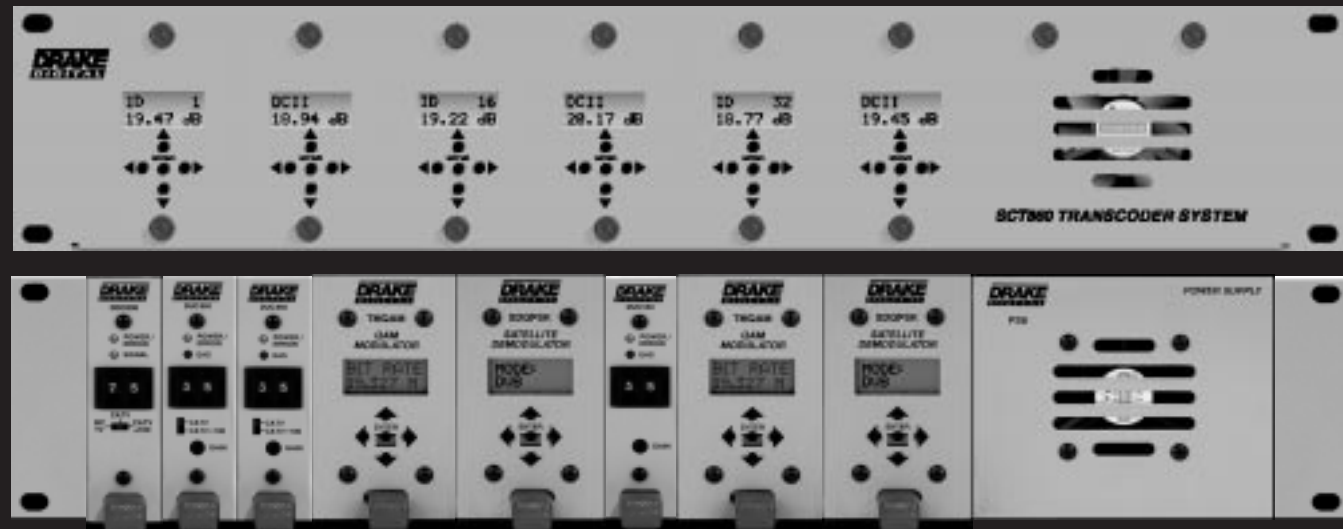


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## Options for Cable Delivery of Off-Air Digital Signals

With the continued increase in the number of digital off-air transmissions as the transition to all digital broadcasting proceeds, delivery of these signals to cable customers becomes more desirable regardless of the requirements of new "Must Carry" rules that will be forthcoming. Cable customers who have invested in a digital TV or monitor with HDTV display capabilities and who do not have or desire to have an off-air antenna, will certainly be demanding that local digital broadcast signals are available via their cable service. The following lists some of the possible solutions to such availability using **DRAKE** component series digital products.



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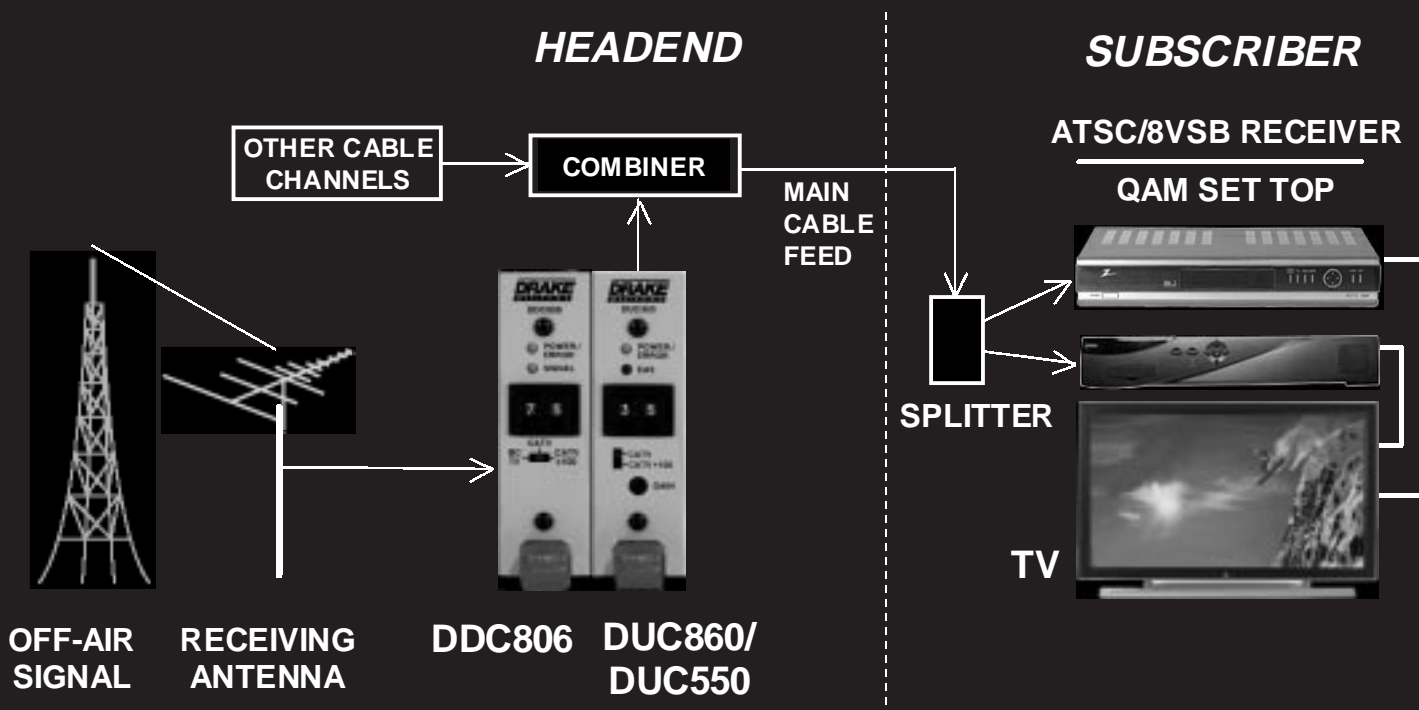
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## Channel Translation - 8VSB Delivery

This simple approach utilizes a **DRAKE** DDC806 Digital Downconverter in conjunction with a **DRAKE** DUC860 or DUC550 Digital Upconverter to perform a translation of the desired off-air signal to the desired channel on the cable system.

The subscriber is required to have an ATSC/8VSB receiver to successfully receive and display the HD program material on his digital display. If the TV or monitor does not include the digital tuner, an external receiver, such as the Zenith HDV420, can be added. This ATSC/8VSB receiver (external) could be the subscriber's own unit or the receivers could be provided/leased to the subscriber by the system operator. An appropriate splitter or switch would also be required to direct the cable feed to the different boxes involved (e.g. the ATSC/8VSB receiver and a Motorola DSR-470 for HITS QT systems or a DCT unit for Classic HITS systems).

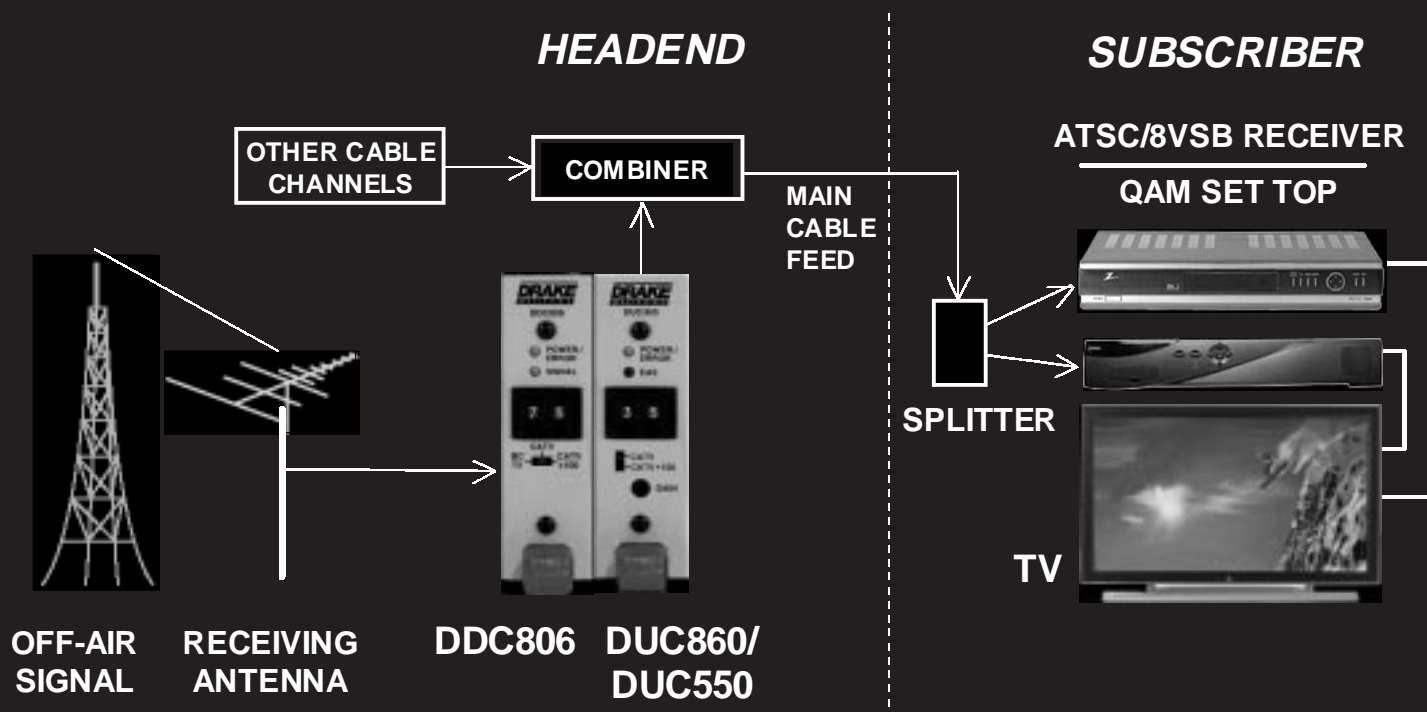


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## Channel Translation - 8VSB Delivery, *continued*

It is currently believed that all or most ATSC/8VSB receivers will function properly in this scenario even though the signal is being received on a RF channel that is different than that indicated in the signal's VCT (Virtual Channel Table) contained in the PSIP (Program & System Information Protocol) data. The VCT data associates a digital signal's RF channel number/frequency with the station's NTSC channel number/frequency for branding purposes. For example, if a station's digital signal is being transmitted on channel 41 and its NTSC signal on channel 7, the receiver stores this association in its memory. In this case 7 is referred to as the Major channel number. The ATSC/8VSB receivers display channels in a **Major CH # - Minor CH#** format. In this example 7-0 would be displayed if the receiver were tuned to NTSC Channel 7 using its analog tuner. 7-1 would be displayed if it was tuned to Channel 41 and receiving an HD (High Definition) signal using the receiver's digital tuner. 7-x (x=2 to 99) would be displayed when the receiver was tuned to the Channel 41 digital signal but receiving one of several possible SD (Standard Definition) or data signals.

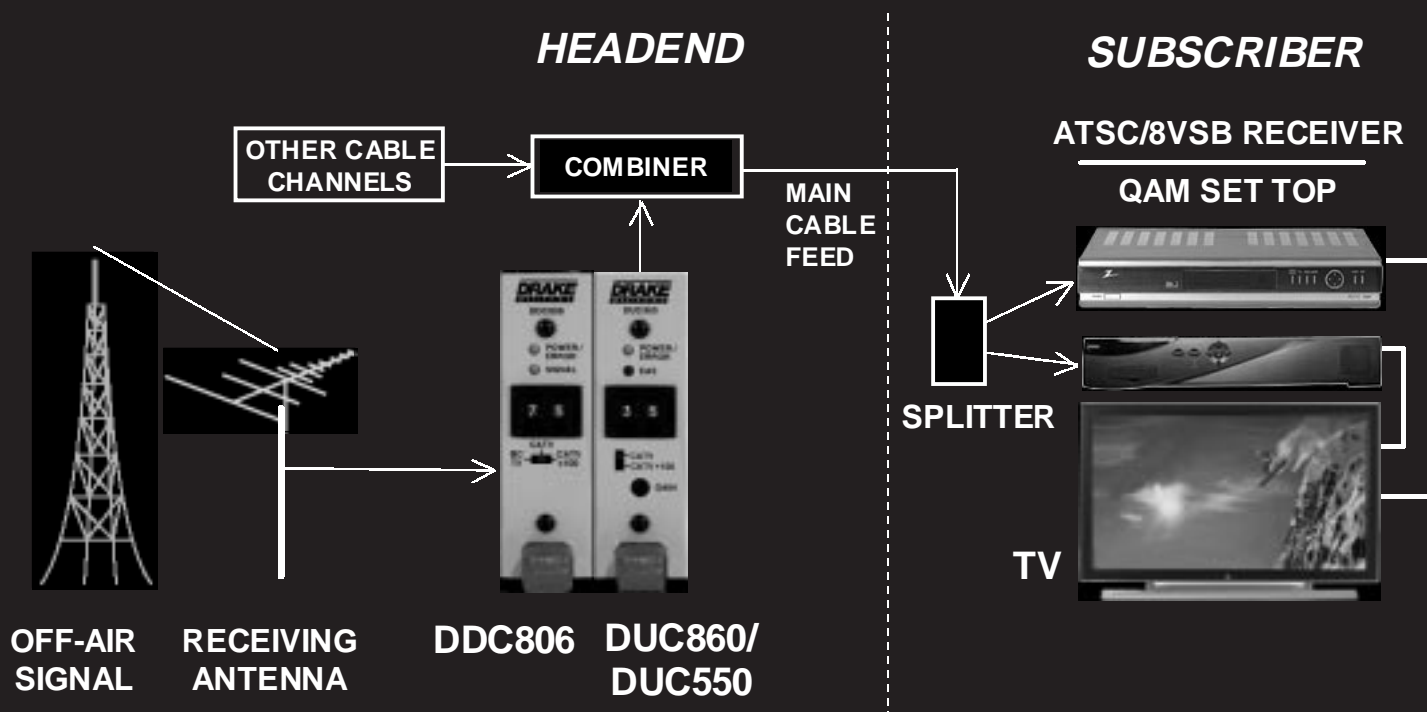


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## Channel Translation - 8VSB Delivery, *continued*

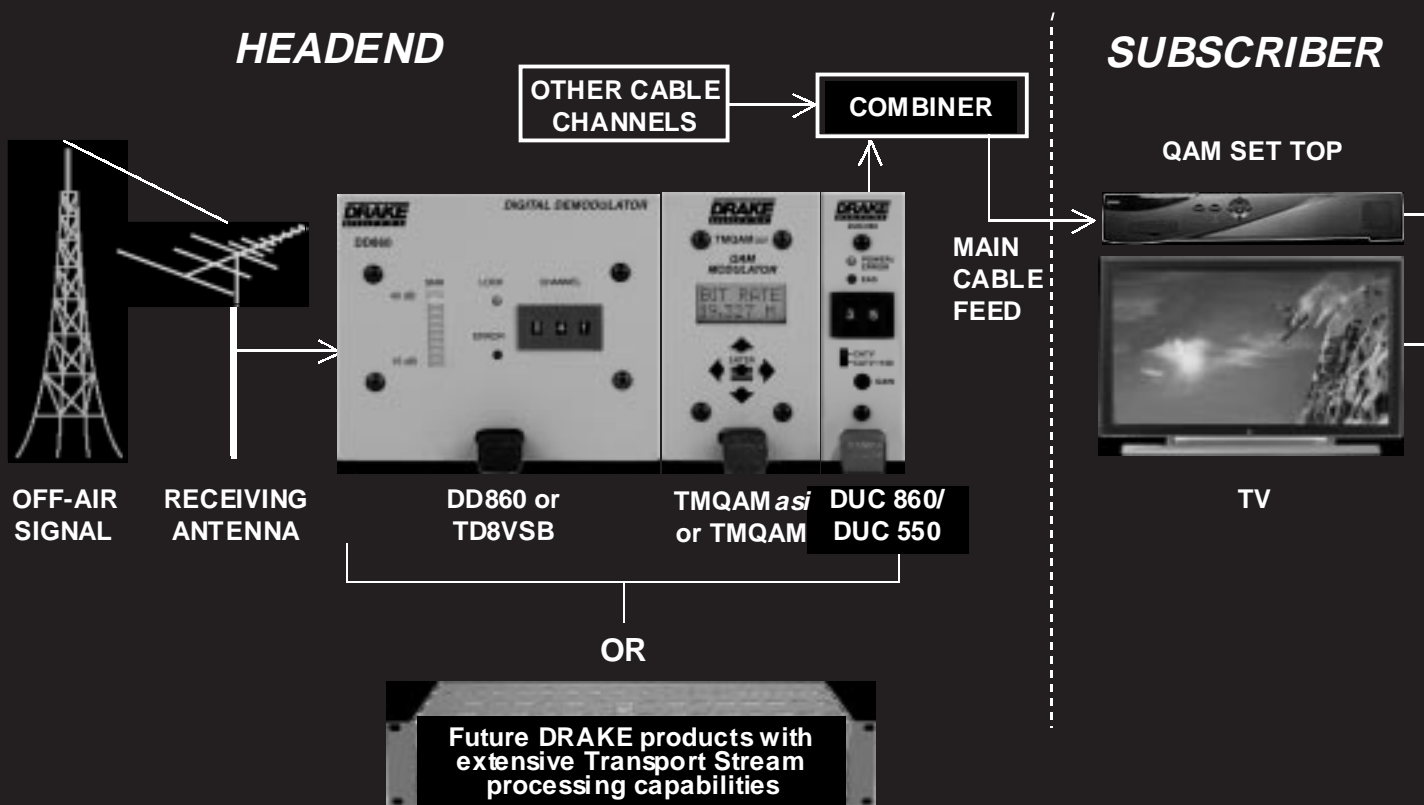
It is our understanding that ATSC/8VSB receivers are capable of determining that they are receiving a digital signal with a TSID (Transport ID) RF Channel association that differs from the same association in the signal's VCT (Virtual Channel Table). It then remembers the actual received association and uses this information rather than that indicated in the VCT. The result is that the receiver still displays the correct **Major CH#-Minor CH#**.



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## Channel Transcoding (Transmodulation) – QAM Delivery

This approach requires Transcoding or Transmodulation (different terms for the same function), of an off-air 8VSB signal/signals to a QAM modulated signal for cable delivery. A simple system could utilize the **DRAKE** TD8VSB off-air Tuner/Demod or the DD860 Tuner/Demod, a TMQAM Modulator and either a DUC860 or DUC550 Upconverter to perform the required transcoding.



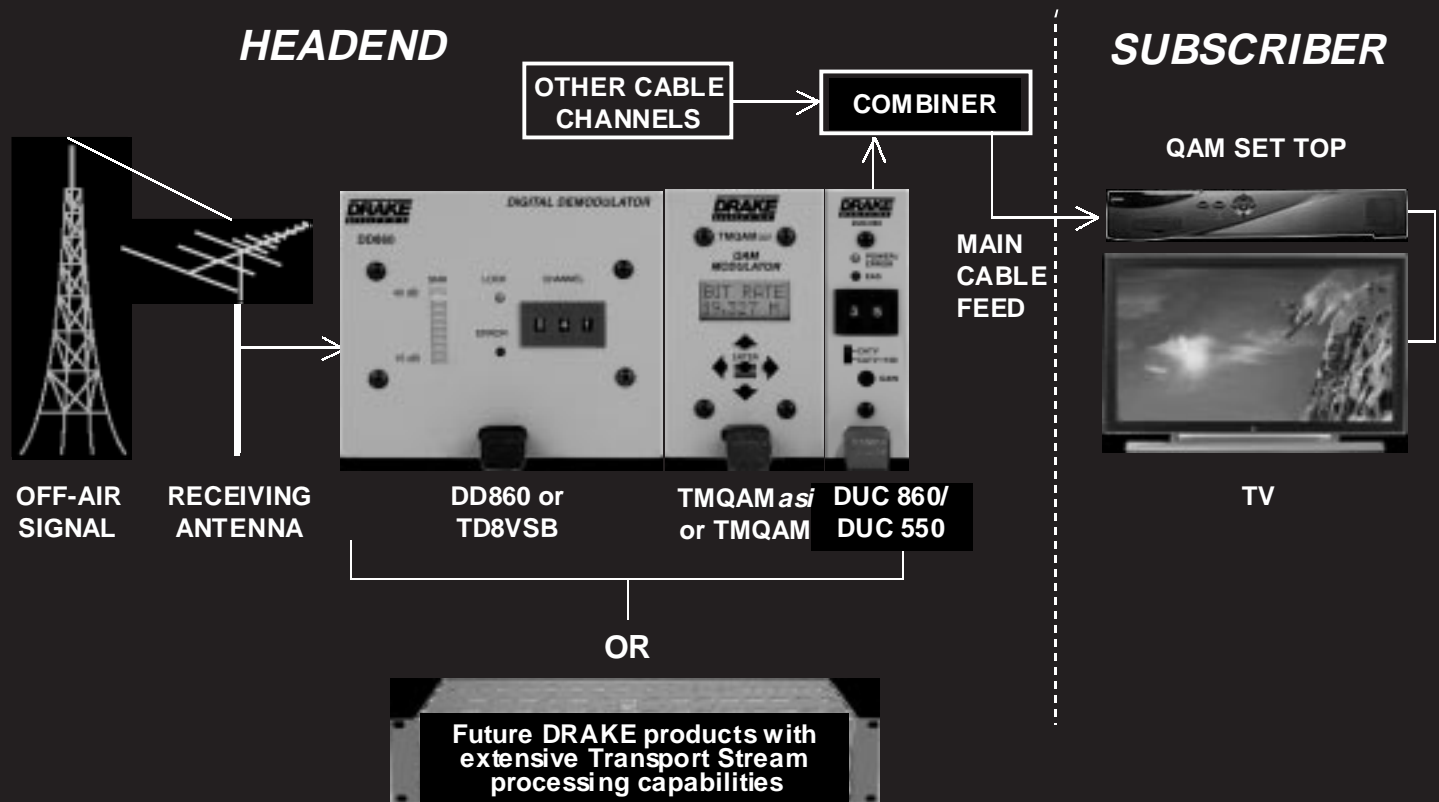
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## Channel Transcoding (Transmodulation) – QAM Delivery, *continued*

More demanding applications will likely require other functional requirements such as PID filtering and multiplexing to generate a “custom” transport stream that is a multiplex of more than one program. The resulting “custom” multiplex could also contain program material from sources other than off-air (digital video servers, etc.). These multiple programs or “sub streams” are functionally segregated in the transport stream by the use of PID’s (Packet Identifiers). A PID is data contained in a packet that identifies the packet as belonging to a specific group or program.

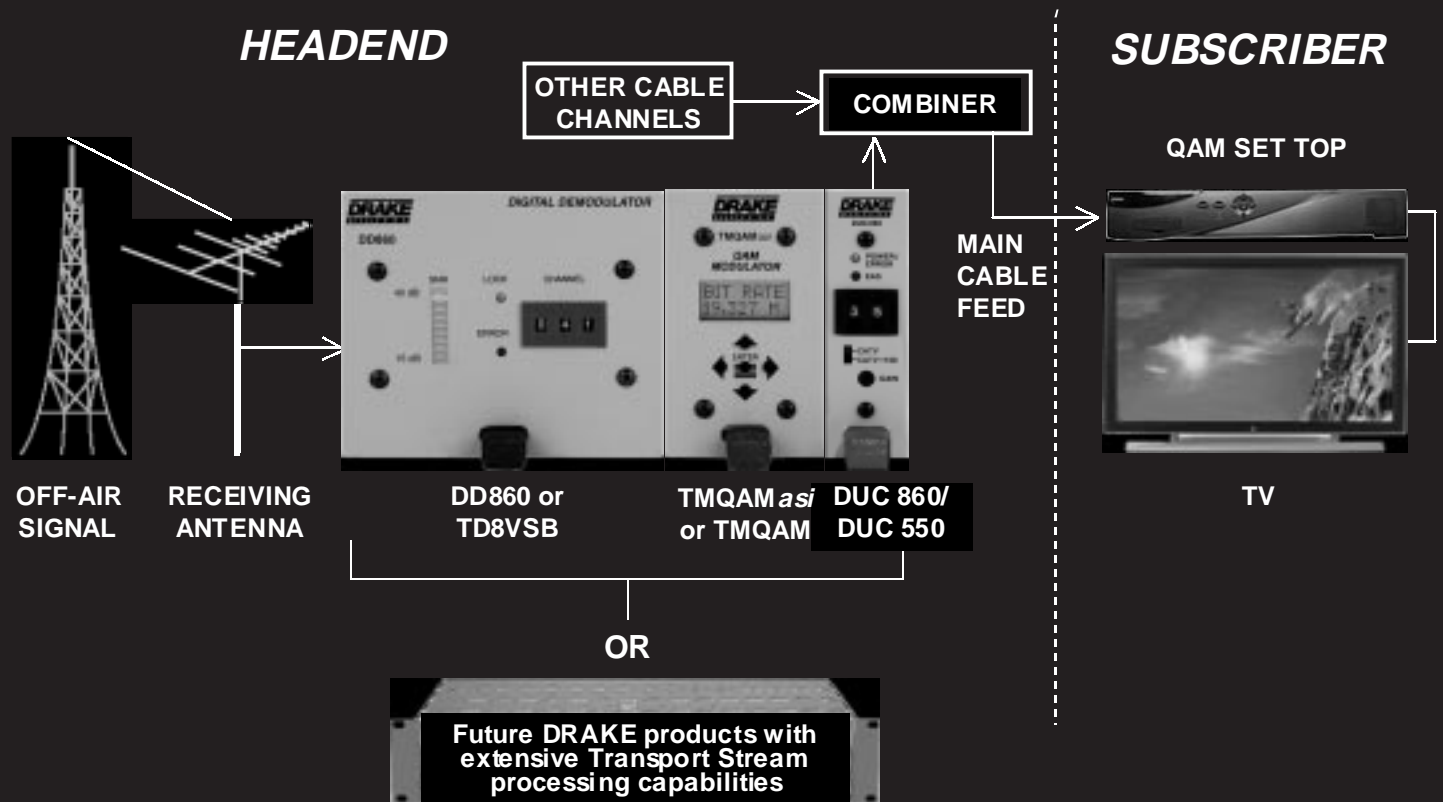


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## Channel Transcoding (Transmodulation) – QAM Delivery, *continued*

The transport stream could be assembled to contain an HD program + an SD program, several SD programs, and in the case of the HITS QT platform using Motorola DSR-470 STB's, it would require insertion of the HITS QT in band data stream. If 256 QAM was being used, the transport stream could contain two off-air HD programs. Classic HITS systems using the Motorola DCT platform use OOB (Out-Of-Band) authorization delivery, so no in band data stream would need to be inserted into the composite transport stream.



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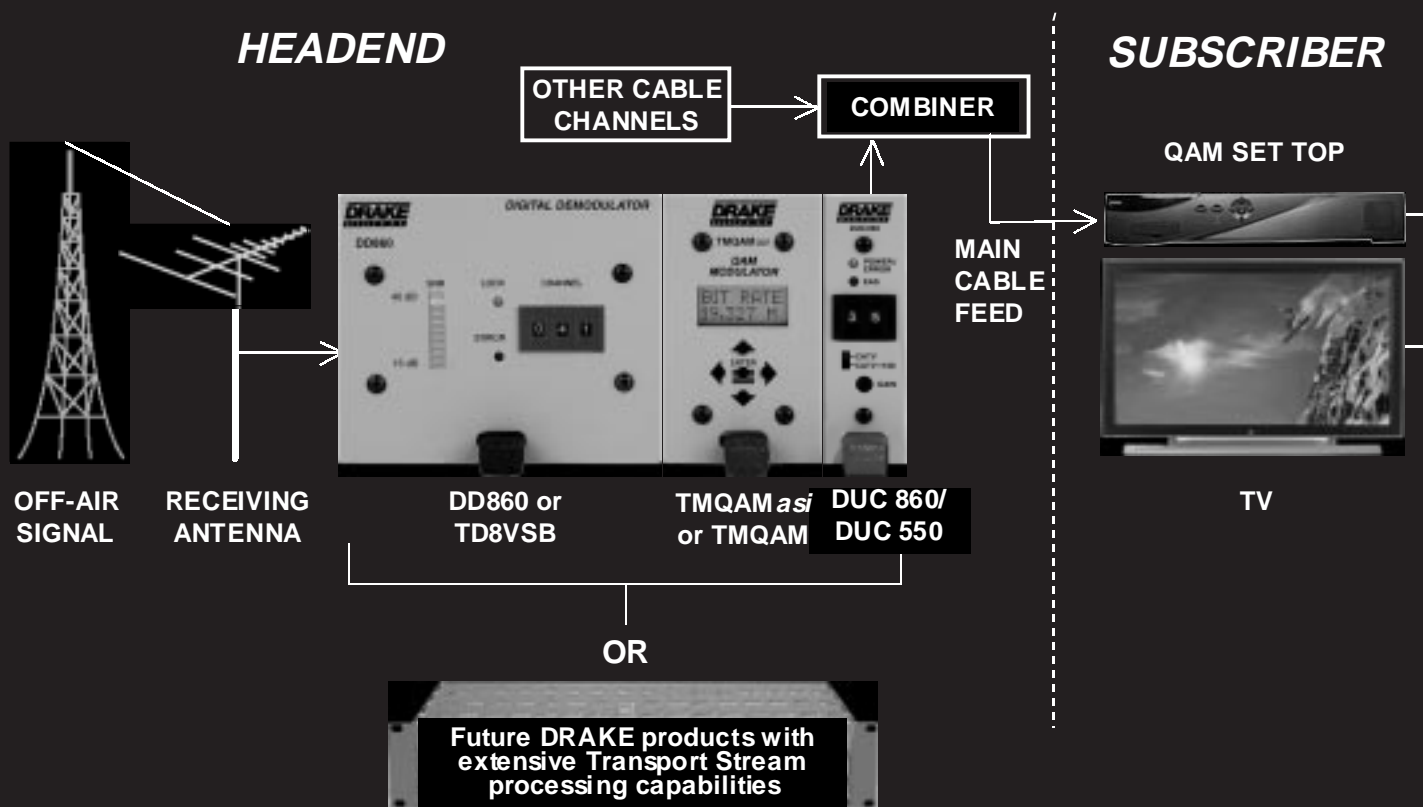
# Channel Transcoding (Transmodulation) – QAM Delivery, *continued*

On either HITS QT or Classic HITS systems, subs would require a STB with appropriate channel mapping to fully integrate the delivered programming into the system (Program Guide listings, etc.). Since the transcoded signal will more than likely carry HD programming, at least at certain times, a further requirement is for the subscriber to have an appropriate HD decoder. HITS QT systems would require such a decoder (e.g. the Motorola HD-200) in addition to the DSR-470. DCT based systems would require the same HD decoding capability either in the form of a stand-alone decoder (e.g. HD-200) or a DCT STB with integral HD decoding capabilities. Decoding and display of SD signals would not require any additional boxes other than a “native” STB for the system being used.

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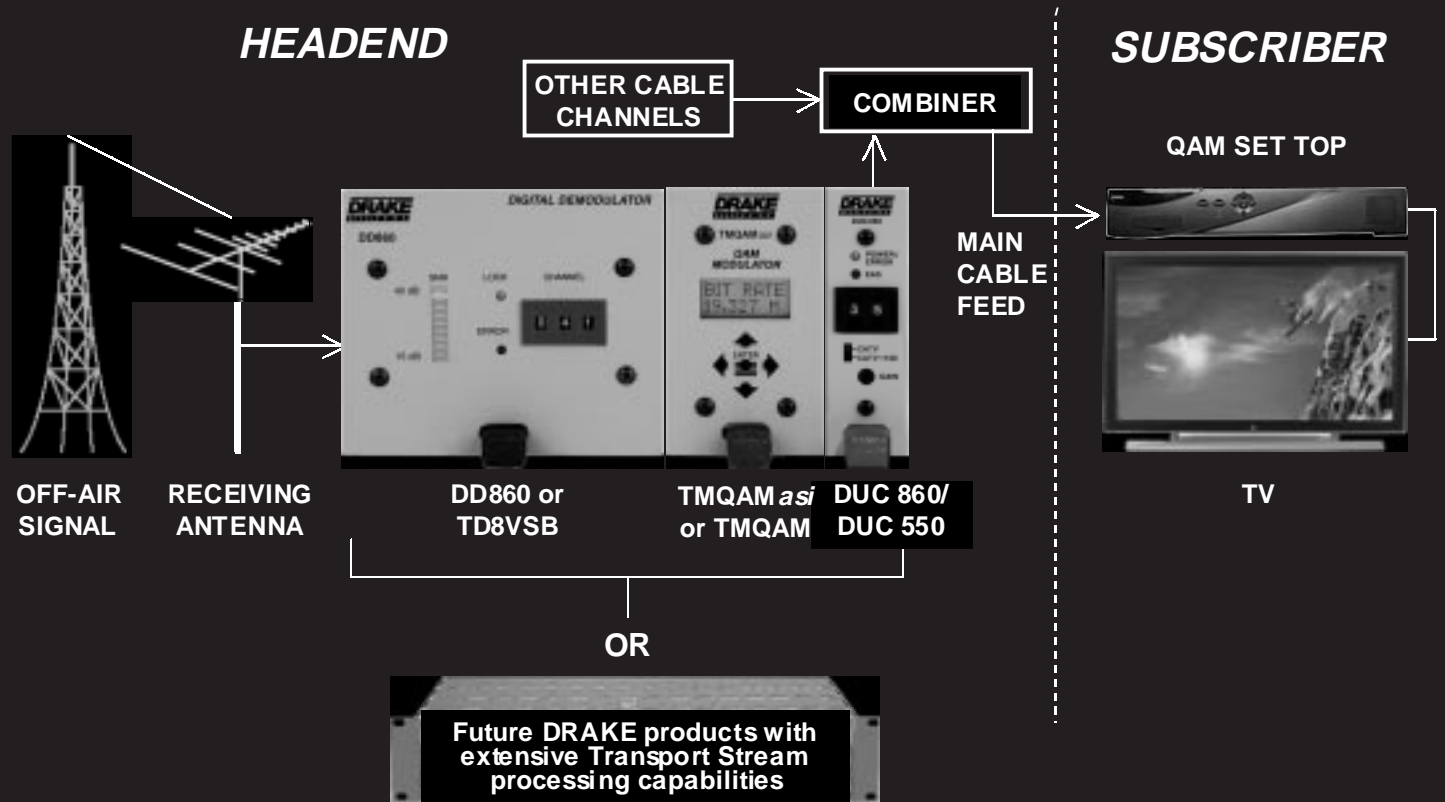
# Channel Transcoding (Transmodulation) – QAM Delivery, *continued*

**DRAKE** currently has available headend products to make 8VSB Channel Translation delivery and “simple” QAM delivery of digital off-air signals a reality. Although we are actively pursuing development of additional products for QAM delivery of digital off-air programming that will provide complete transport stream processing capabilities, full implementation is dependent on appropriate channel mapping additions for the Motorola STB’s to properly integrate these channels into HITS QT & Classic HITS systems. At this time we feel these changes involve software updates only and are seeking Motorola’s cooperation and input on finalizing a solution.

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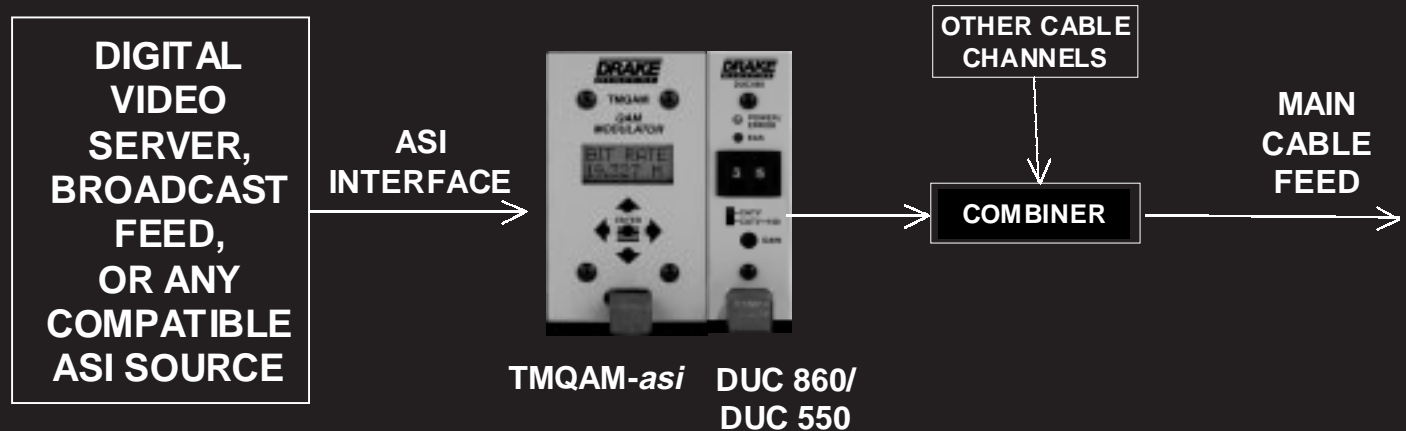
## *Other Applications For DRAKE Component Series Digital Products*

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The TMQAM and TMQAMasi (ASI serial input version) in conjunction with a DUC860 or DUC550 can be used to generate a QAM modulated signal on any desired channel. The transport input stream to the modulator could be sourced from a digital video server, derived from a fiber feed, or any other desired transport stream source.

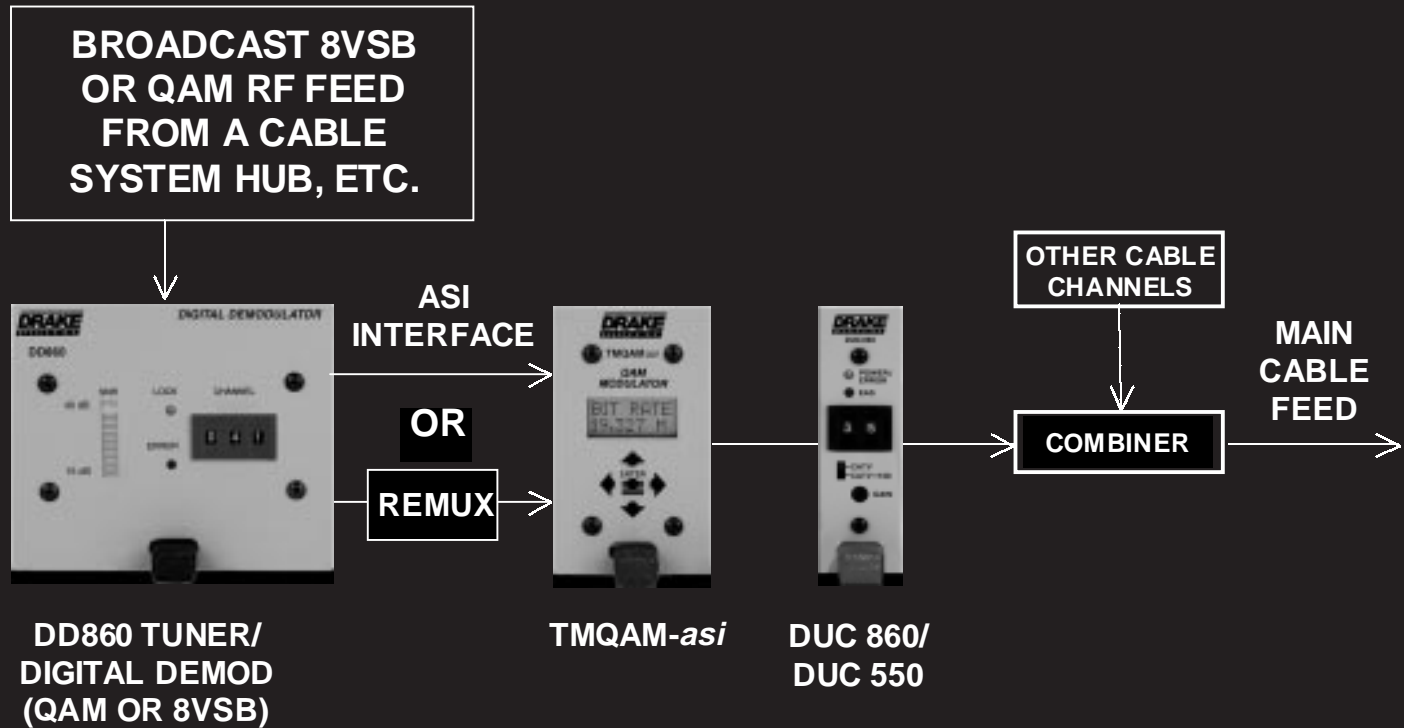


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## *Other Applications For DRAKE Component Series Digital Products*

The DD860's RF input covers 54 to 860 MHz. It can be configured to demodulate either 8VSB or QAM signals and provides an ASI output.

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