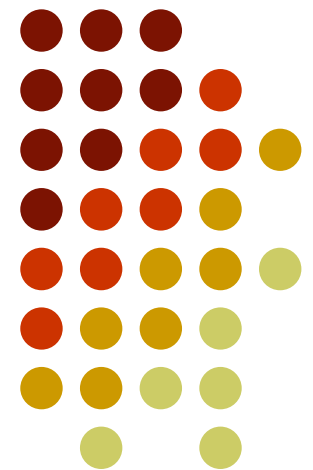


COMBINING MULTIPLE PRIMARY SIGNALS ON ONE DTV TRANSLATOR

Greg Best P.E.

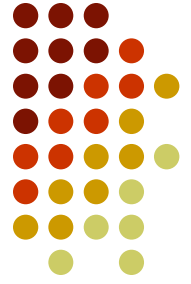
Greg Best Consulting, Inc.
9223 N. Manning Avenue
Kansas City, MO 64157





What Is It??

- Simply put this means combining signals from different DTV primary stations on to one DTV translator--Multicasting
- Results in one RF channel with multiple programs streams
- Example—ABC, CBS, FOX, NBC & PBS affiliates all coming from one DTV translator
- Primary station = Full Service Transmitter input signal



Presentation Outline

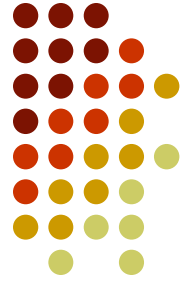
- Discuss why this might be employed
- Identify the technical, regulatory, and economic aspects with focus on technical
- Look at options for implementation
- What are the devils in the detail
- Cost comparison of different implementations and versus multiple translators
- Cover miscellaneous issues



Reasons For This Approach

- Not enough spectrum for separate DTV translators
- Not enough site space for separate DTV translators
- Interim solution until more resources of spectrum or land are available

Technically, Administratively, Economically Feasible???



- Technical Aspects
- Good News
 - Technically possible and is similar to other “Multicasting” models for multiple SD programs.
- Bad News
 - Not enough data rate to support multiple HD signals.
 - Translator failure means all signals lost

Technically, Administratively, Economically Feasible???



- Administrative Aspects
- Requires coordination between primary stations
- Good News
 - Lots of opportunity
 - Permitted by FCC rules
- Bad News
 - Competitors must work together

Technically, Administratively, Economically Feasible???



- Economic Aspects
- Good News
 - Not as expensive as you might think
 - New equipment and features make this idea feasible
- Bad News
 - Market segment is undetermined so manufacturer support may be uncertain

Technical Issues



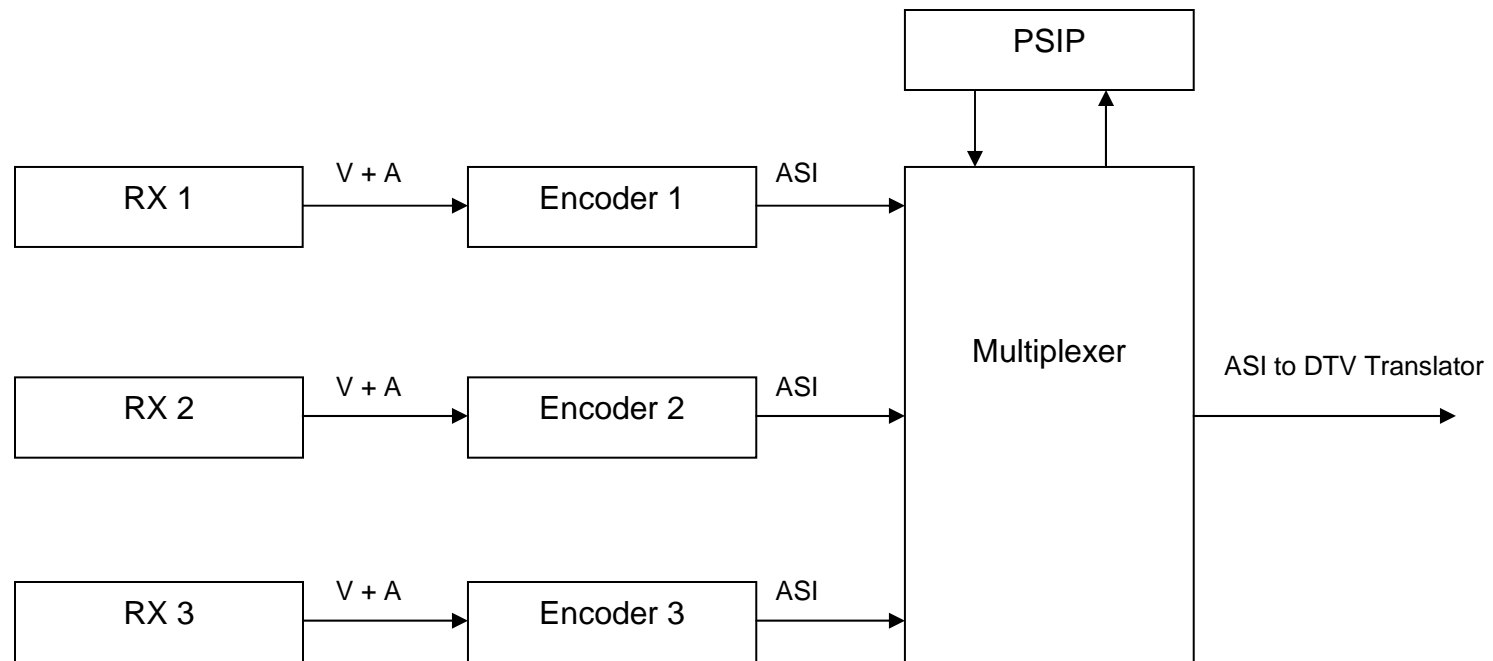
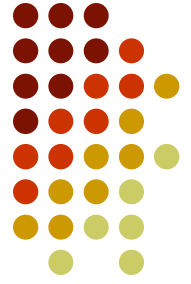
- Good News
 - Technically possible and is similar to other “Multicasting” models for multiple SD programs.
- Bad News
 - Not enough data rate to support multiple HD signals.

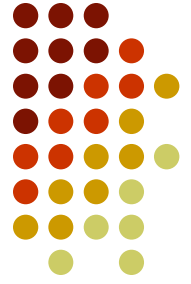


How To Implement This

- Method #1--Receive, decode to video & audio, re-encode each signal, and multiplex all together, re-transmit.

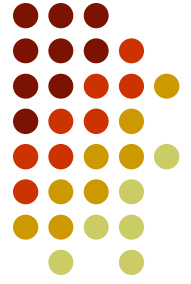
How To Implement This Method 1 – Re-encode





Pros and Cons—Method 1

- Pros
 - Data flow is easier to manage
 - Should prevent overflows and losses of data
 - Fixed or statistic multiplexers
 - Receivers can be STB
 - Allows easy monitoring of Video and audio if desired



Pros and Cons—Method 1

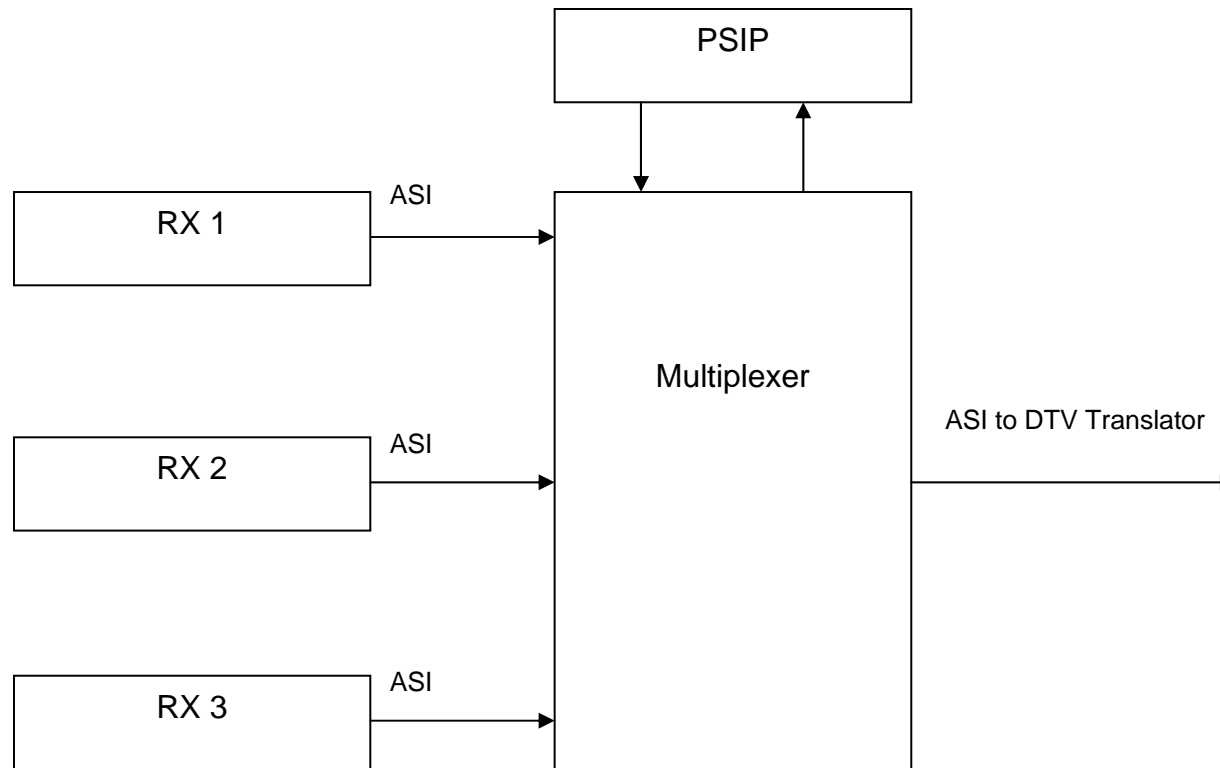
- Cons
 - Cost of Encoders
 - If HD is desired need to build in that amount of complexity



How To Implement This

- Method #2--Receive, multiplex all transport streams together, re-transmit

How To Implement This Method 2 – Straight Multiplex





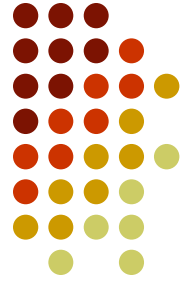
Pros and Cons—Method 2

- Pros
 - More economical
 - Can adapt to different HD or SD feeds more easily



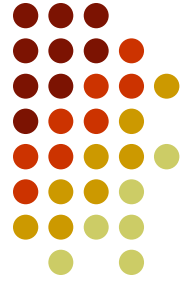
Pros and Cons—Method 2

- Cons
 - Receivers require ASI output—more difficult to monitor
 - Multiplexer requires more monitor and control—Utilize PID select
 - More coordination between primary stations



Administrative Logistics

- Not banned by FCC rules
- No current standard application form
 - (i.e. which source becomes the “primary” for the 346 form)
- Re-transmission agreements with each primary DTV station
- Coordination among primary stations



Administrative Logistics

- May need new policies or additional rules
- Form 346—Hossein has a plan
- Re-transmission agreements are easy for community translator organizations but what about translators owned by primary stations.
 - (Incestuous business??)



Economic Issues

- Dependent on how many program streams and other technical issues.
- Dependent on what data rate associated with each program stream.
- Base case of 4 program streams each with 5 MB capacity to make the numbers easy to work with.



Economic Issues

- Method #1 Re-encoding to SD rates
- 4 RX \$ 500
- 4 Encoders \$16000
- 1 MUX \$10000
- 1 PSIP \$ 8200
- PC & other \$ 2000
- System Cost \$27700



Economic Issues

- Method #2 ASI Pass thru with PID select
- 4 RX \$3200
- 1 MUX \$8000
- 1 PSIP \$8200
- PC & other \$2000
- System Cost \$21400



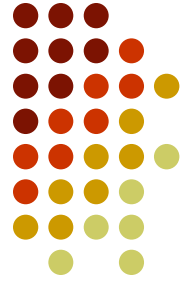
Comparative System Costs

- Reference Base is a 4 DTV Translator System with 50 watts nominal TPO
- 4 DTV Translators \$100000
- 4 RX antennas \$ 400
- 4 TX antennas \$ 12000
- System Cost \$112,400



Comparative System Costs

- Revised System with one DTV 50 watt Translator plus multiplexing system
- 1 DTV Translator \$25000
- 4 RX antenna systems \$ 1200
- 1 TX antenna \$ 3000
- Multiplex system \$27700
- System Cost \$56,900



Miscellaneous Issues

- Monitoring and Control of DTV Translator
- Future improvements in number of program streams per given data capacity (i.e. MPEG-4)
- Stream Monitors for each source



Summary and Conclusions

- Technically viable
- Requires coordination and cooperation between primary stations
- Price reductions of equipment, higher levels of integration, and new features have brought costs down

Time to Look at My Watch



QUESTIONS