

DTV Translator - Implementation

presented to
National Translator Association Convention
May 5, 2007

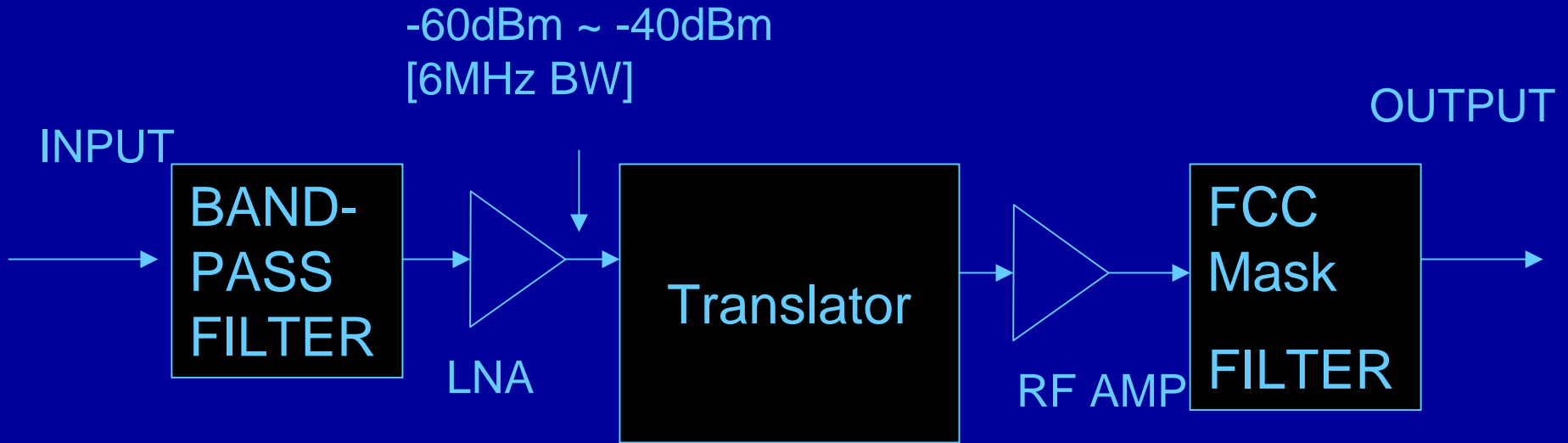
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- ❑ **Translator Types**
 - ❑ **Analog Translator**
 - ❑ **Digital Translator w NTSC re-modulation**
 - ❑ **Digital Translator w 8VSB re-modulation**
 - ❑ **8VSB On-Channel Booster**

- ❑ **NTIA Grants Availability**
- ❑ **Conclusions**

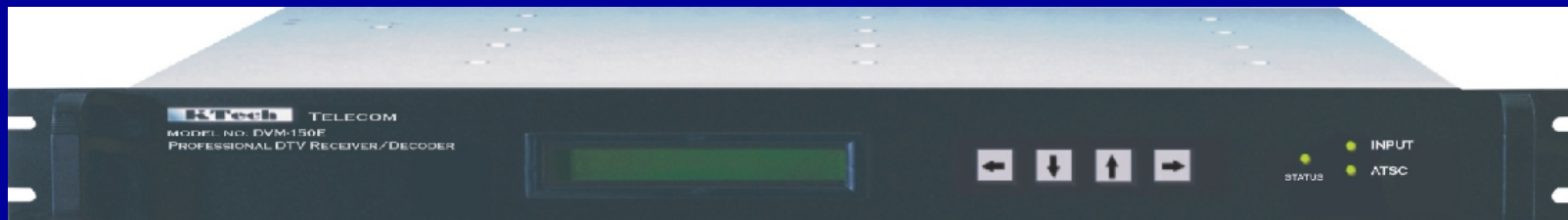
Basic Set-up



SMPTE-310M or ASI MPEG2 Transport Stream for Digital Translators

- Local Program Insertion
- Microwave Input

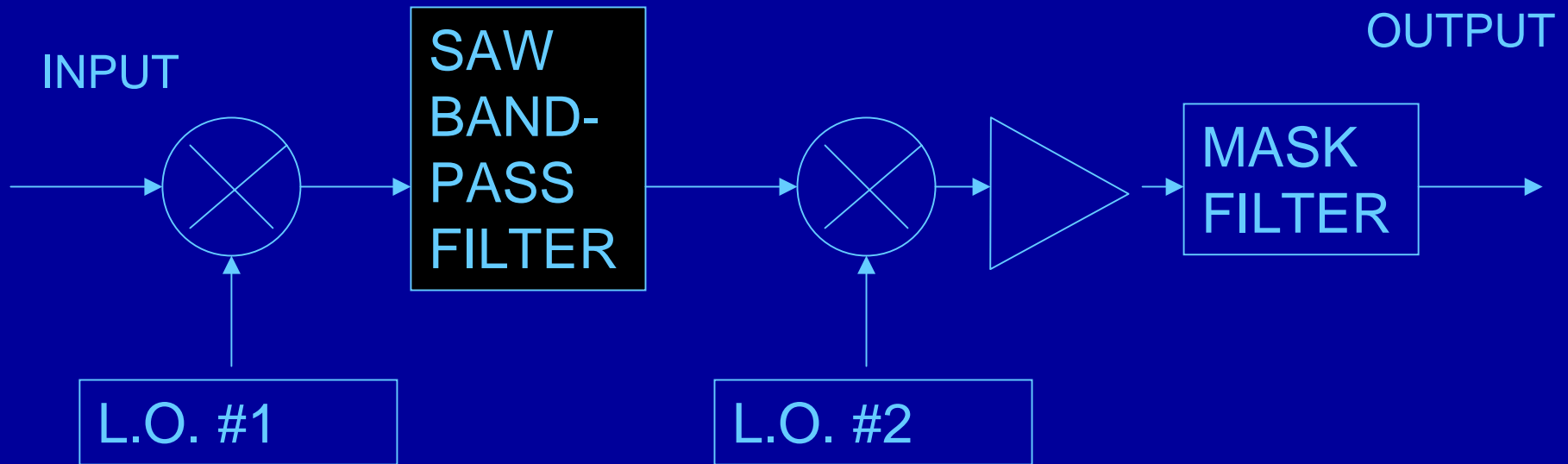
- Power Meter**
 - Spectrum Analyzer w Power Measurement Capability**
 - Wideband Power Meter w front-end 6MHZ BPF**
- 8VSB Decoder**
 - Shows you decoded Video & Audio**
 - Measures Received SNR, BER, Pwr**
- Translator**
 - Analog Translator or Frequency Translator**
 - Digital Translator with Analog (NTSC) Output**
 - Digital Transcoder with Digital (8VSB) Output**
 - Digital On-Channel Booster**



- ❑ **Manufactured by Ktech: DVM-150E**
 - ❑ **8VSB Receiver/Decoder**
 - ❑ **Meets NTIA 3008 Digital-to-Analog Conversion Eqpt**
- ❑ **Inputs**
 - ❑ **8VSB RF**
 - ❑ **option for SMPTE-310M and DVB-ASI**
- ❑ **Outputs**
 - ❑ **Measures SNR, BER, Power**
 - ❑ **Analog NTSC Video and Audio w SAP**
 - ❑ **option for ASI and SMPTE-310M Out**

Analog Translator - SAW Filter

[Hetrodyne Translator]

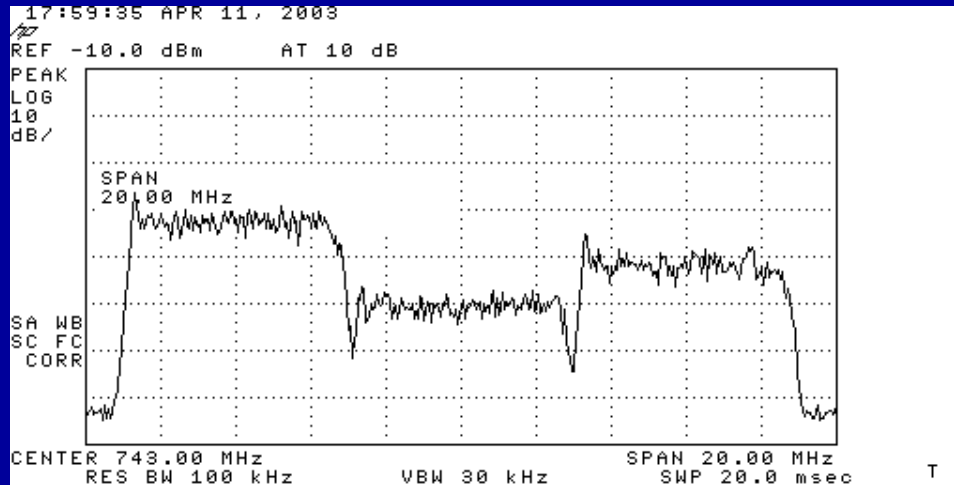


- ❑ Beware: some call this “Digital Processor”
- ❑ Poor Adj CH rejection by SAW Filter
- ❑ Multi-path at Input is sent out at the Output
- ❑ Output SNR Degradation by SAW Filter & Mask Filter

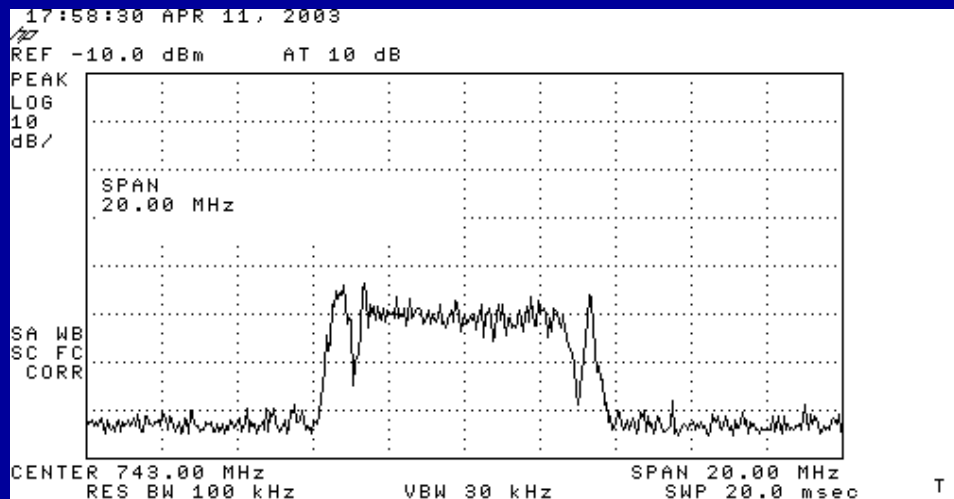
Analog Translator

- Adjacent Channel Interference Issues

INPUT

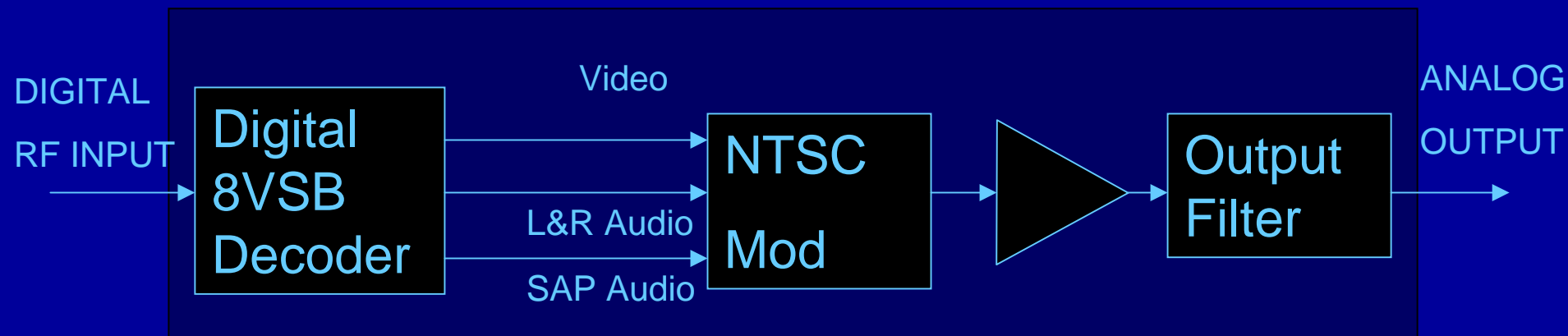


OUTPUT



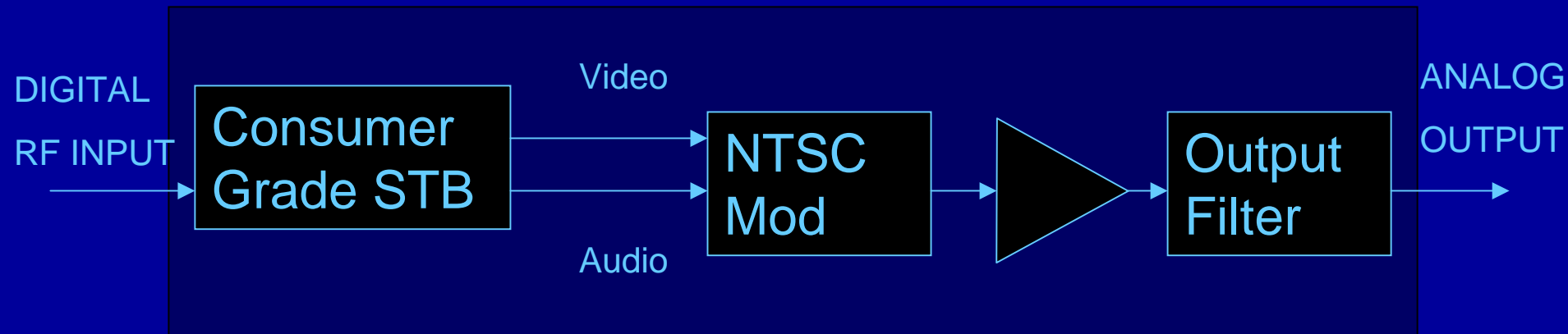
Advantages	Disadvantages
Simple and reliable	May not provide adequate adjacent channel rejection
Low cost	No co-channel interference rejection
Low delay throughput	No multi-path interference rejection
	No noise reduction
	Output SNR Degradation by SAW filter

- Reduction of Coverage and poor signal translation**



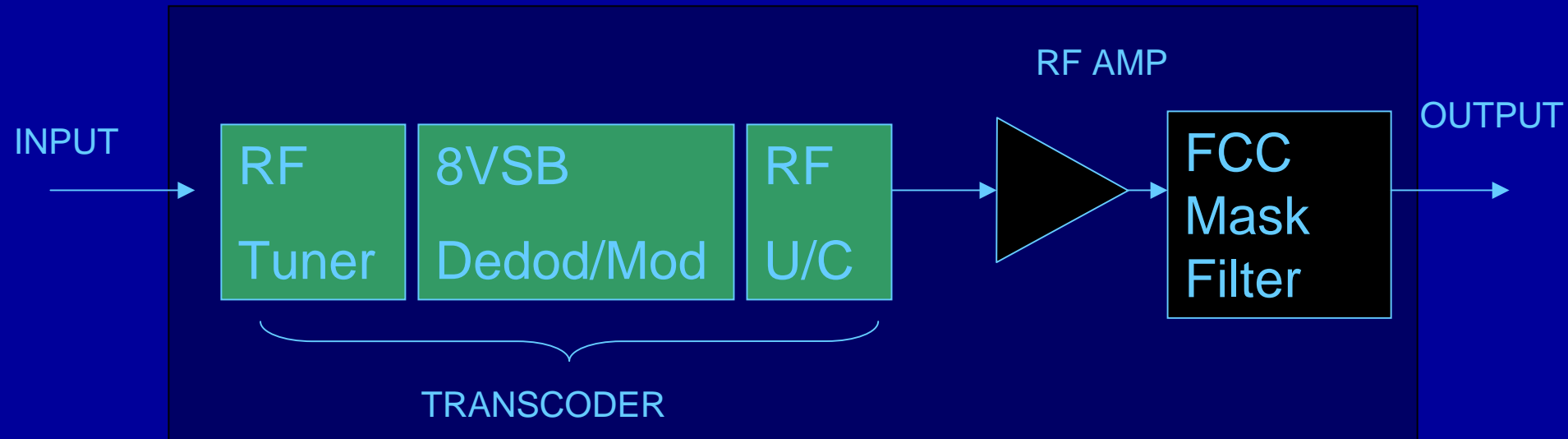
- Digital to Analog Converter
- **Meets NTIA 3008 Digital-to-Analog Conversion Eqpt**
- Agile 8VSB Receiver/Decoder
- Agile NTSC Modulator
- 8VSB in => NTSC Out
- NTIA Grants available for this operation

- WHY NOT USE CONSUMER STB?



- Consumer Grade 8VSB Set-Top-Box
 - Low Cost
 - No simultaneous SAP
 - Loss of Power resets to Primary Program
 - No Tech Support [firmware upgrade]

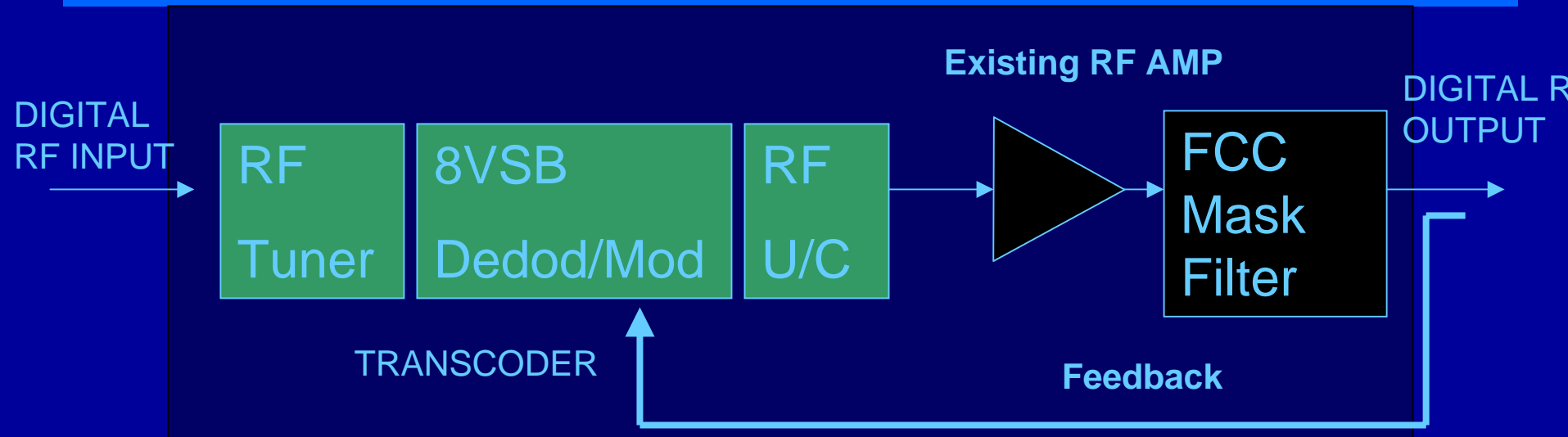
Digital Translator - Transcoder



- Transcoder [8VSB in => 8VSB out]
- **Meets NTIA 3009 Digital-to-Digital Conversion Eqpt**
- Recommended for less than 30W application
- PSIP & TSID Modification
- No output SNR correction
- **No output IMD monitoring**

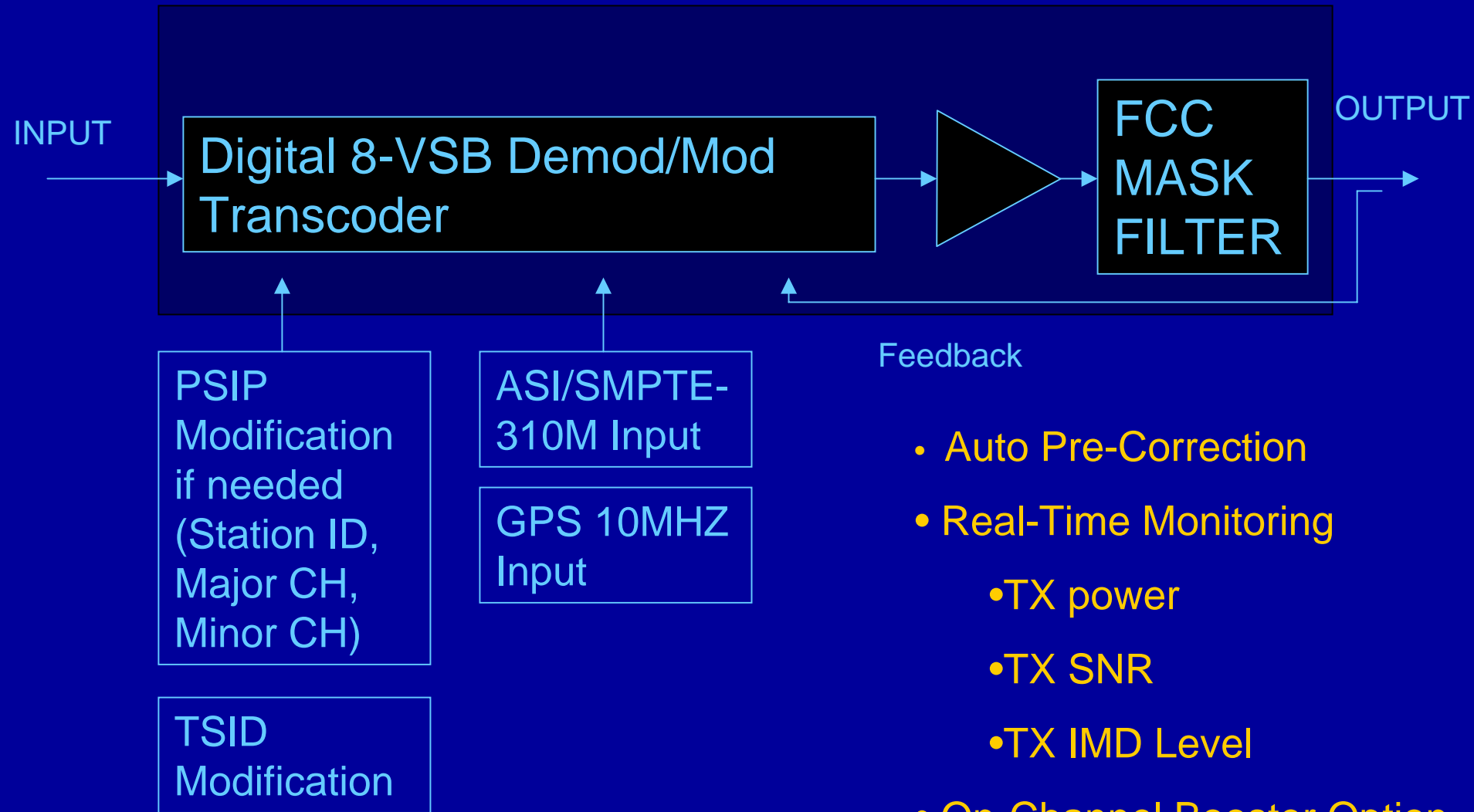
Advantages	Disadvantages
8VSB Regeneration	No Feedback for 8VSB output No Linear Pre-Correction No Non-linear Pre-Correction
Low cost	No Detection for IMD Level No Detection for TX SNR
PSIP & TSID Modification	No External 10MHZ Reference

Digital Translator - Transcoder w feedback



- **Meets NTIA 3009 Digital-to-Digital Conversion Eqpt**
- **Feedback adds Capabilities:**
 - TX power Monitoring
 - TX SNR Monitoring
 - TX Linear & Non-linear Pre-correction
 - TX IMD Level Monitoring
 - Recommended for >30 W TX Pwr Application

Digital Transcoder with feedback





- ❑ **Manufactured by Ktech: XTREME-1000**
- ❑ **Meets NTIA 3009 Digital-to-Digital Conversion Eqpt**

- ❑ **Inputs - 8VSB RF**
 - ❑ **SMPTE-310M or DVB-ASI**
 - ❑ **RF Feedback, GPS 10MHZ Ref input**
- ❑ **Outputs - 8VSB RF**
 - ❑ **Measures TX SNR, TX Power**
 - ❑ **PSIP & TSID Modification**
 - ❑ **Auto Lin & Non-Line Pre-Correction allows use of existing RF Amplifier**

Advantages	Disadvantages
Dedicated 8VSB in => 8VSB out	Higher Cost
Regenerative 8VSB allows: <ul style="list-style-type: none">* Adjacent Ch-Rejection* Co-channel Rejection* PSIP Modification	
Feedback allows: <ul style="list-style-type: none">* Auto Linear Pre-Correction* Auto Non-Linear Pre-Correction* Real-Time Monitoring of Output SNR* Real-Time Monitoring of Output PWR* Real-Time Monitoring of Output IMD	
Options for GPS Locking & On-Channel Booster	

2-1

KCBS-DT

22-1

KXYZ-TR

- Without PSIP Modification
- With PSIP Modification
- Voluntary Requirement by FCC
- Channel Re-Branding
- PSIP Display can be used to identify Translator Operators
- Translator Operator Identification when problems arise
- Built-in to 8VSB Transcoder [no added cost]

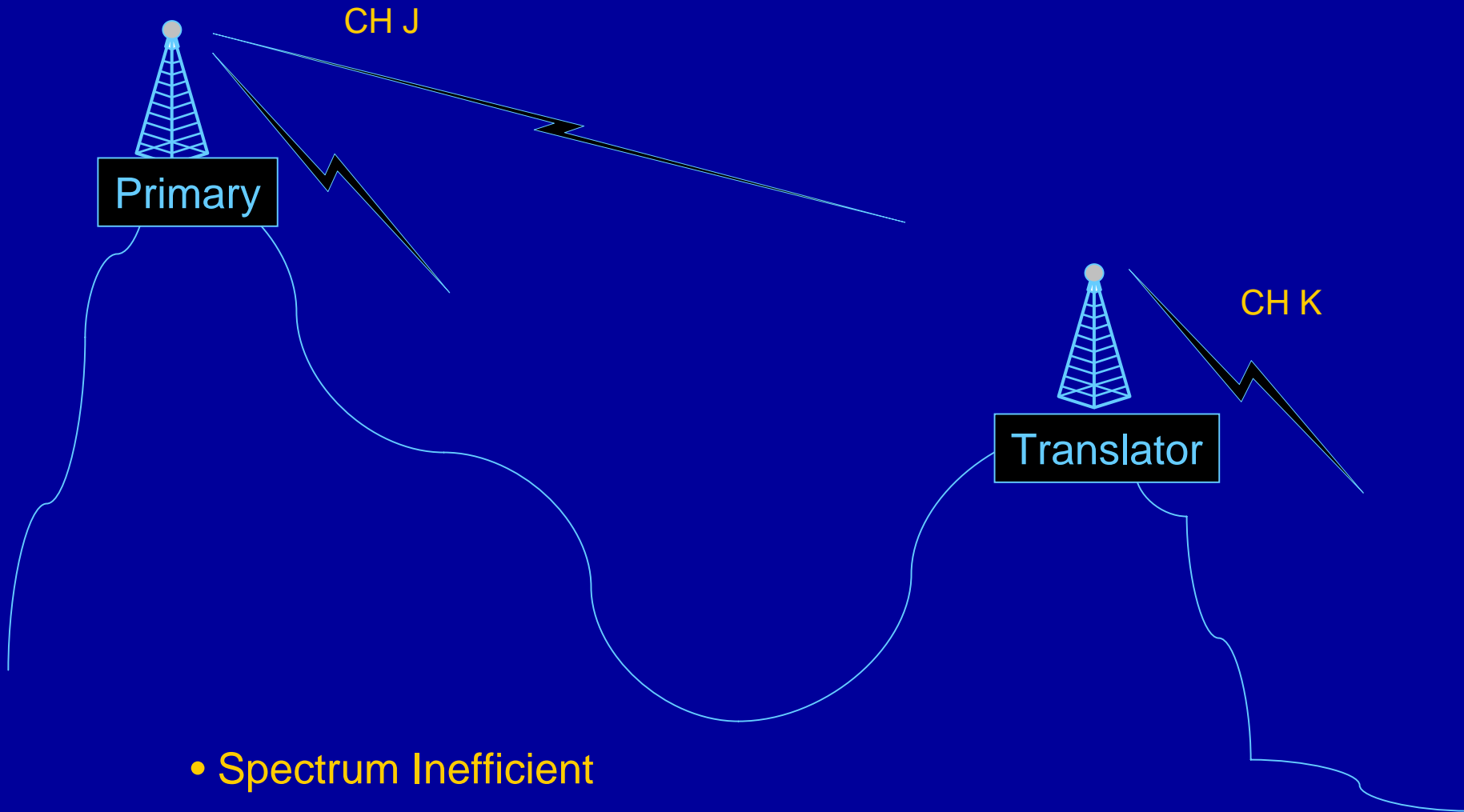
Auto Linear Pre-Correction

- Controls Output TX SNR

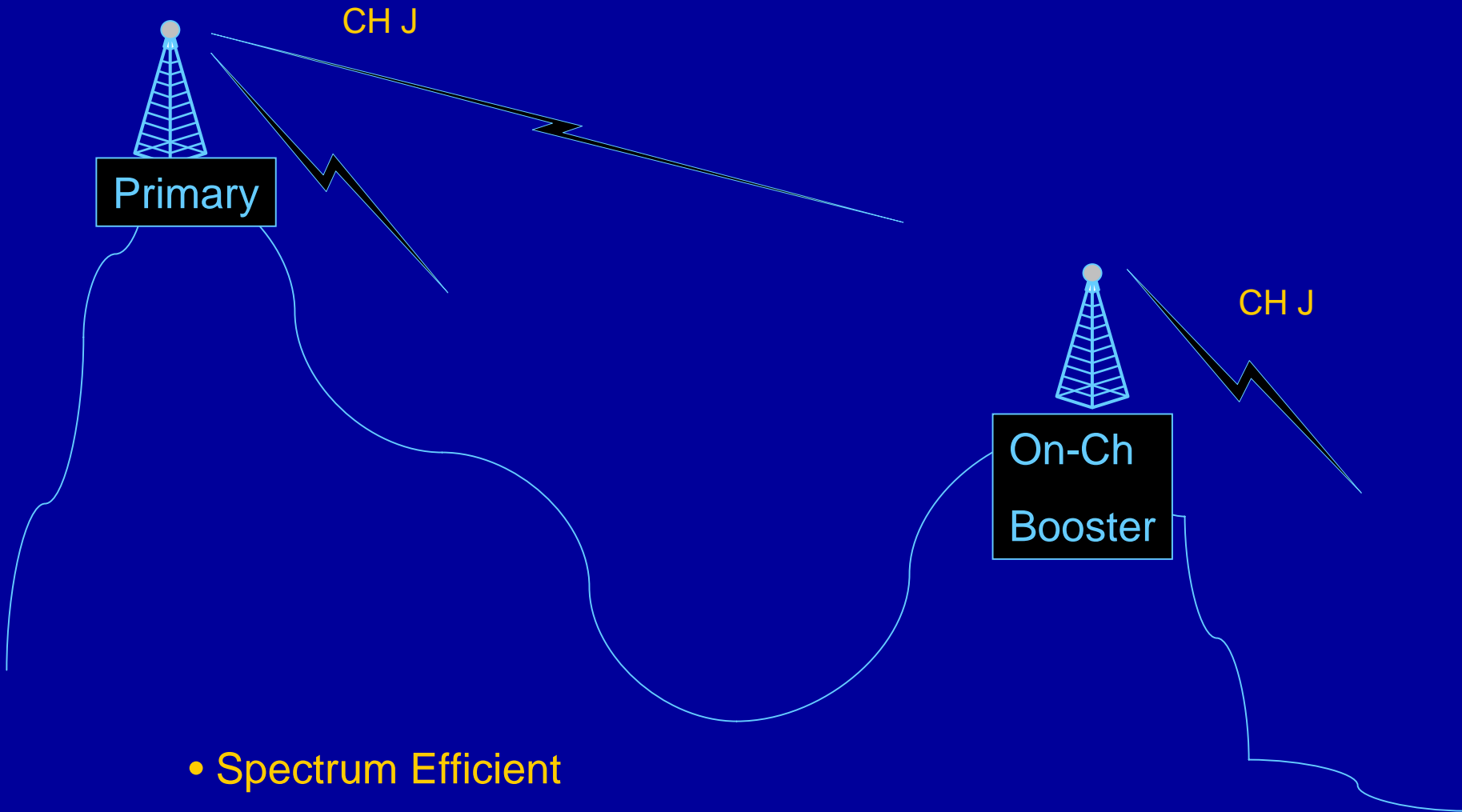
Auto Non-Linear Pre-Correction

- Adapts to Current RF Amplifiers in use
- Automatic Nonlinear Pre-Correction controls IMD level

TV Translator

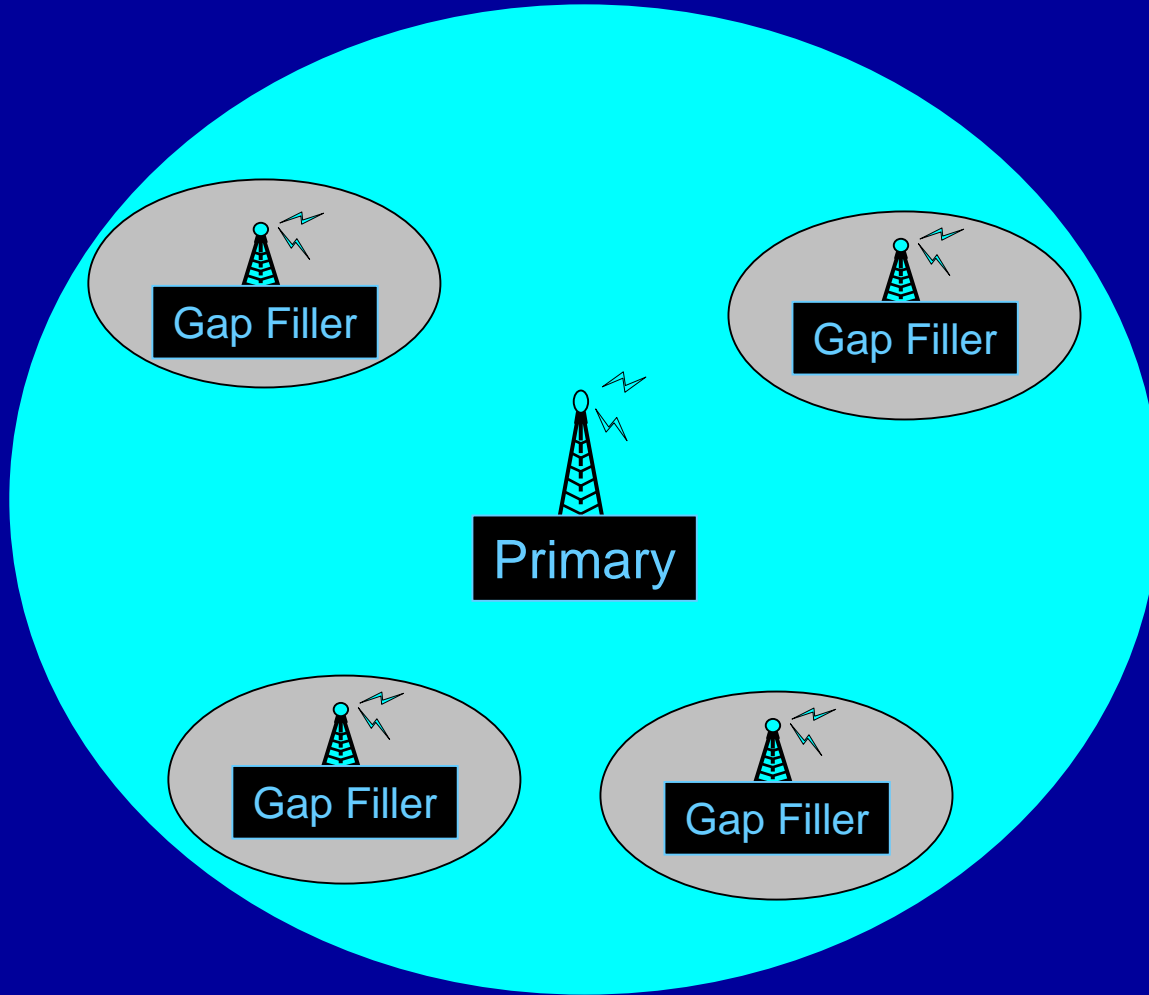


Digital On-Channel Booster



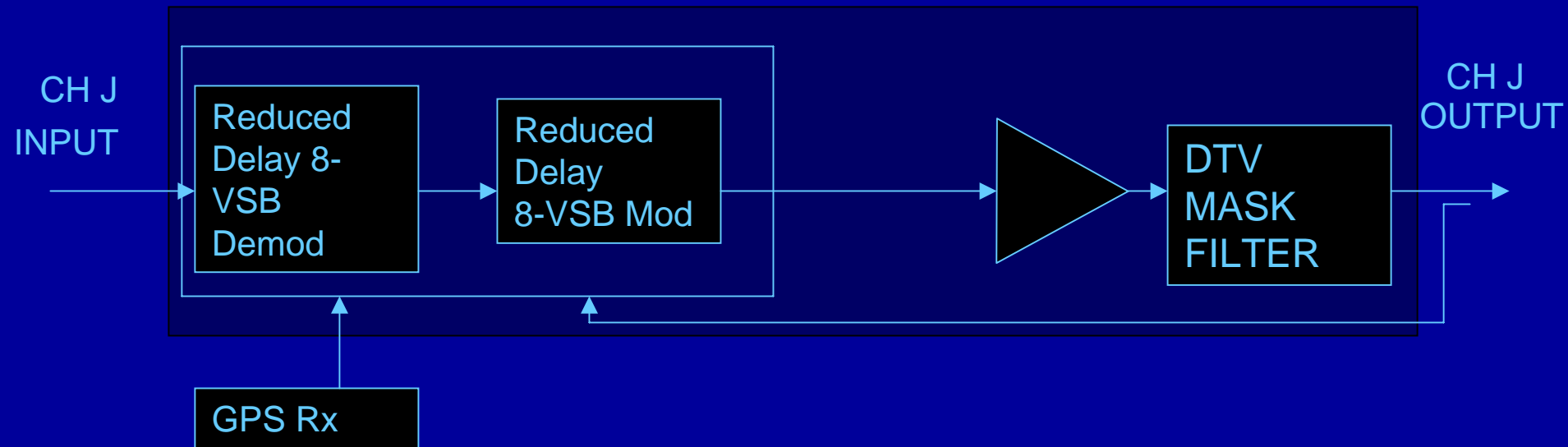
- Spectrum Efficient

Digital On-Channel Booster - Gap Fillers



- Use Microwave Eqpt to connect all the Gap Fillers with the Primary Transmitter
- Synchronize the Gap Fillers to the Primary

Digital 8-VSB On-Channel Booster



- www.ntia.doc.gov
- 8VSB in => NTSC out: Digital to Analog Conversion [section 3008]
- 8VSB in => 8VSB out: Digital to Digital Conversion [section 3009]

Summary

Types	Highlights
Analog Translator	Low Cost No Regeneration 8VSB Poor Adj-Ch rejection
Digital-to-Analog Translator	NTIA 3008 Grants Digital to Analog Conversion
Digital-to-Digital Transcoder w no Feedback	NTIA 3009 Grants Digital to Digital Conversion Recommended for <30W TX Power PSIP & TSID Re-branding
Digital-to-Digital Transcoder with Feedback	NTIA 3009 Grants Digital to Digital Conversion Recommended for >30W TX Power PSIP & TSID Re-branding
Digital On-Channel Booster	Spectrum Efficient

Thank you

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President

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