

# DTV Translator - Implementation

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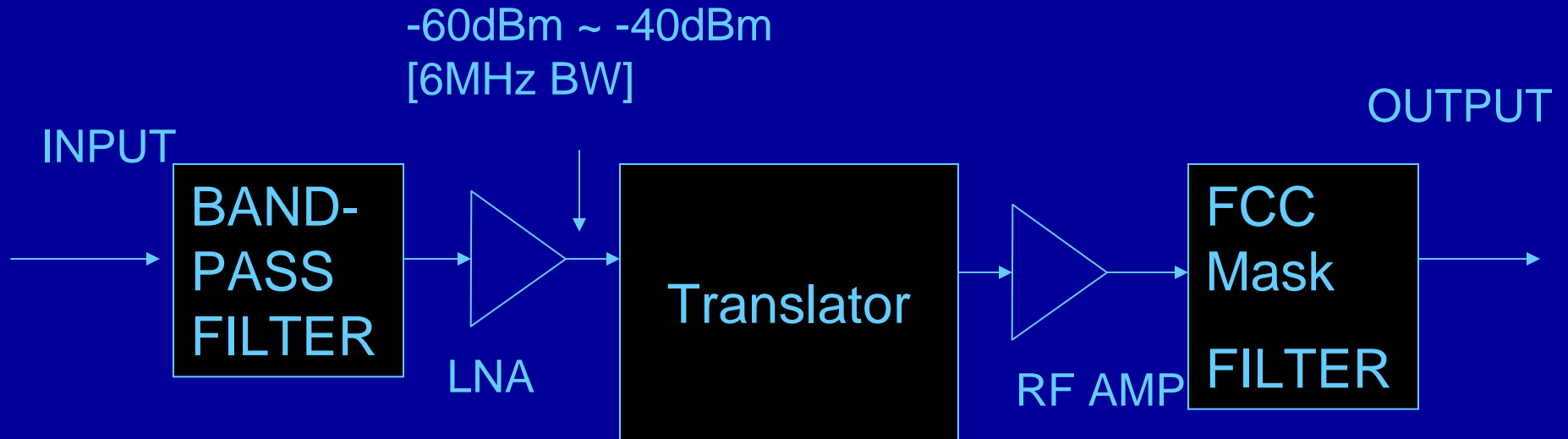
[sk@ktechtelecom.com](mailto:sk@ktechtelecom.com)

- ❑ **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

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

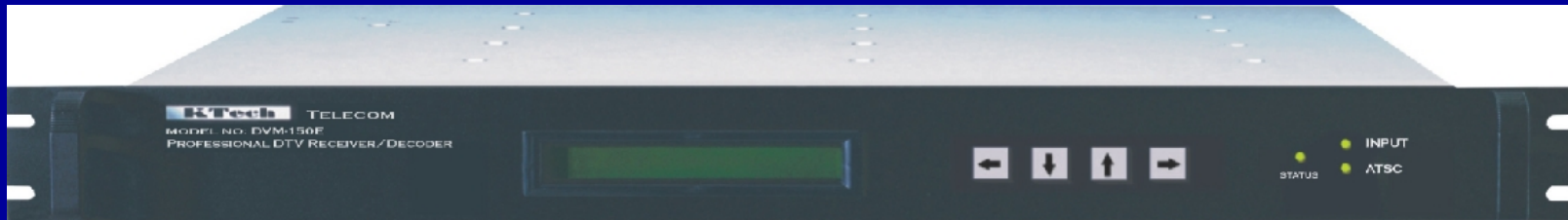
- Local Program Insertion
- Microwave Input

- ❑ **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**

# Basic Equipment

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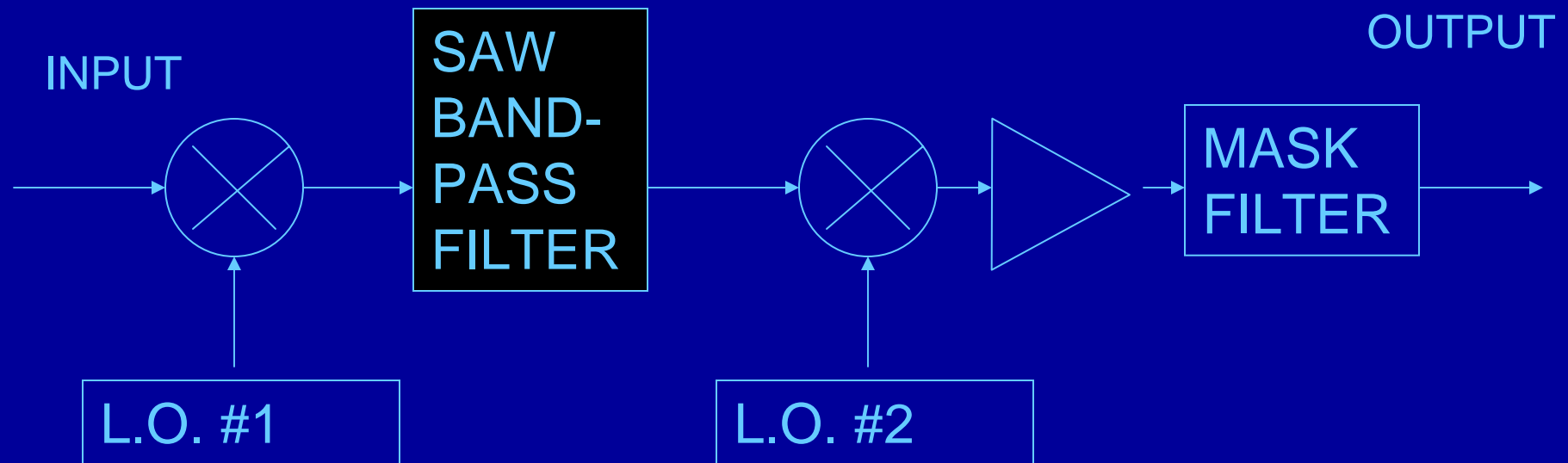
- ❑ **Manufactured by Ktech: DVM-150E**
  - ❑ **8VSB Receiver/Decoder**
  - ❑ **Meets NTIA 3008 Digital-to-Analog Conversion Eqpt**
- ❑ **Inputs**
  - ❑ **8VSB RF**
  - ❑ **option for SMPTE-310M and DVB-ASI**
- ❑ **Outputs**
  - ❑ **Measures SNR, BER, Power**
  - ❑ **Analog NTSC Video and Audio w SAP**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

# Analog Translator - SAW Filter

## [Hetrodyne Translator]

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- ❑ **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**

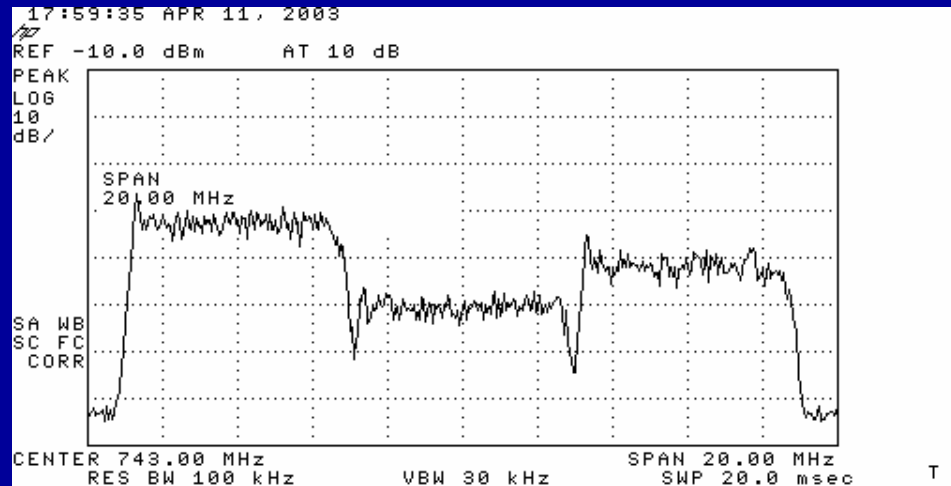
# Analog Translator

## - Adjacent Channel Interference Issues

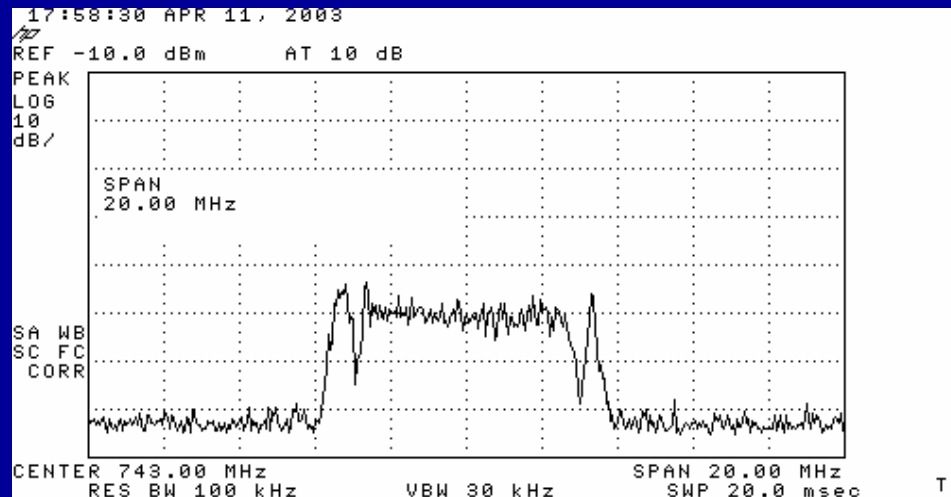
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INPUT

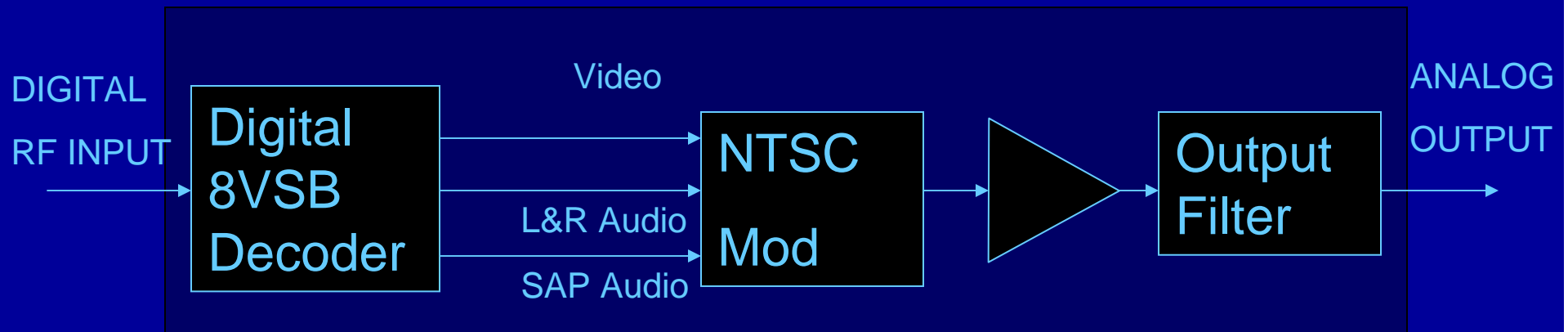


OUTPUT



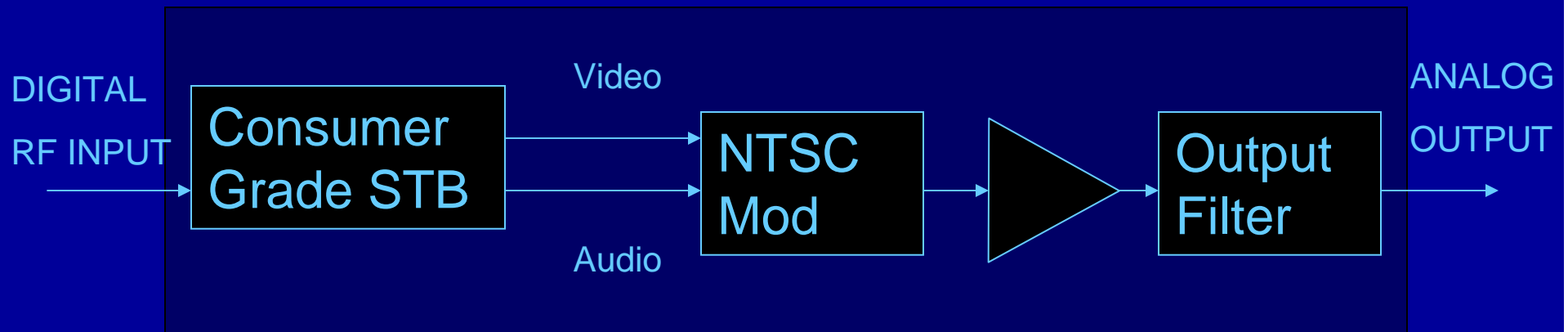
<b>Advantages</b>	<b>Disadvantages</b>
<b>Simple and reliable</b>	<b>May not provide adequate adjacent channel rejection</b>
<b>Low cost</b>	<b>No co-channel interference rejection</b>
<b>Low delay throughput</b>	<b>No multi-path interference rejection</b>
	<b>No noise reduction</b>
	<b>Output SNR Degradation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

- 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?

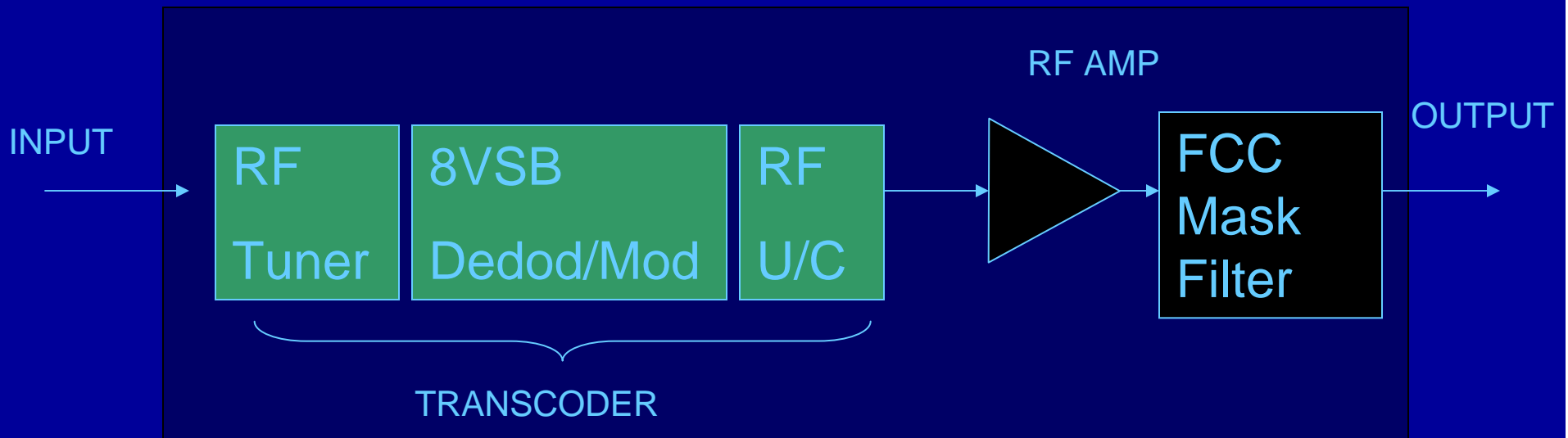


- Consumer Grade 8VSB Set-Top-Box
  - Low Cost
  - No simultaneous SAP
  - Loss of Power resets to Primary Program
  - No Tech Support [firmware upgrade]

# Digital Translator - Transcoder

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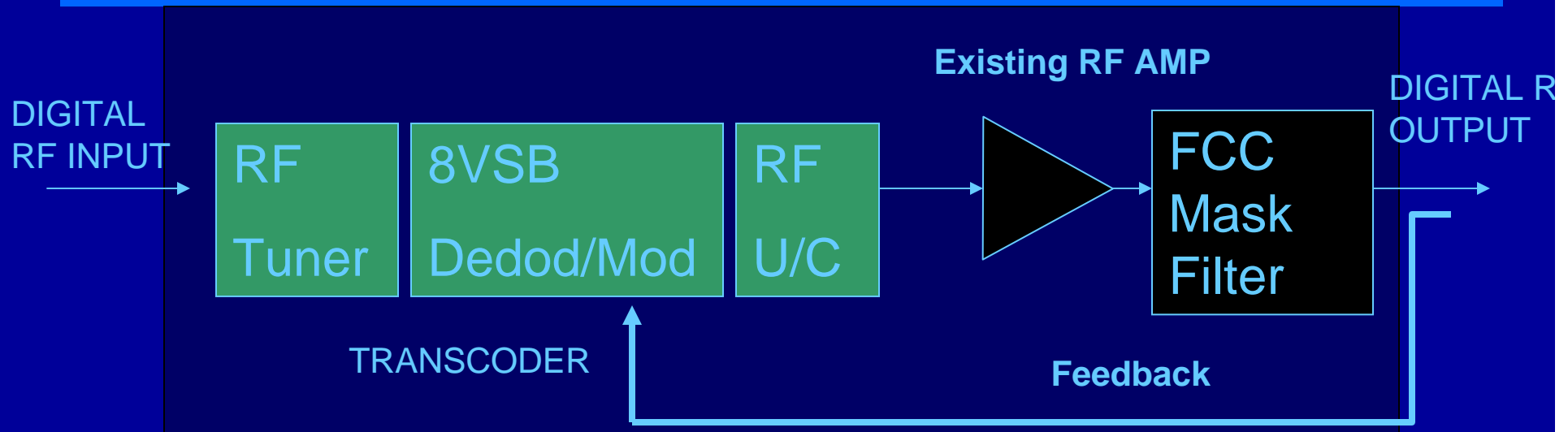
- Transcoder [8VSB in => 8VSB out]
- **Meets NTIA 3009 Digital-to-Digital Conversion Eqpt**
- Recommended for less than 30W application
- PSIP & TSID Modification
- No output SNR correction
- No output IMD monitoring

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

# Digital Translator - Transcoder w feedback

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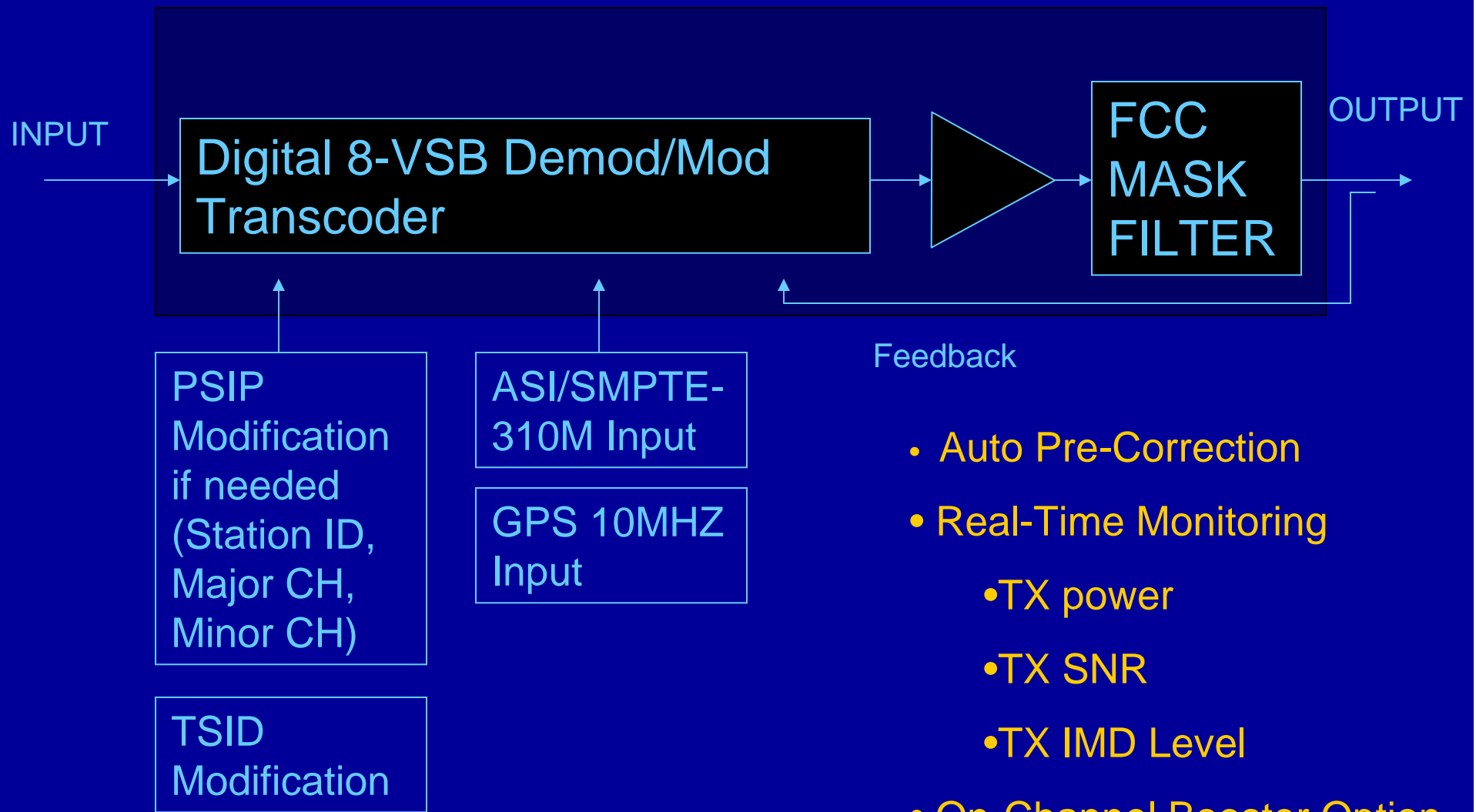


- Meets NTIA 3009 Digital-to-Digital Conversion Eqpt
- Feedback adds Capabilities:
  - TX power Monitoring
  - TX SNR Monitoring
  - TX Linear & Non-linear Pre-correction
  - TX IMD Level Monitoring
  - Recommended for >30 W TX Pwr Application

# Digital Transcoder with feedback

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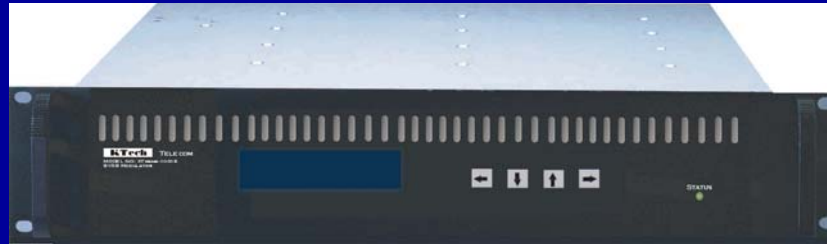


- Auto Pre-Correction
- Real-Time Monitoring
  - TX power
  - TX SNR
  - TX IMD Level
- On-Channel Booster Option

# Digital Translator with 8VSB re-modulation

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- ❑ **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**

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

# PSIP Modification by Translators

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]

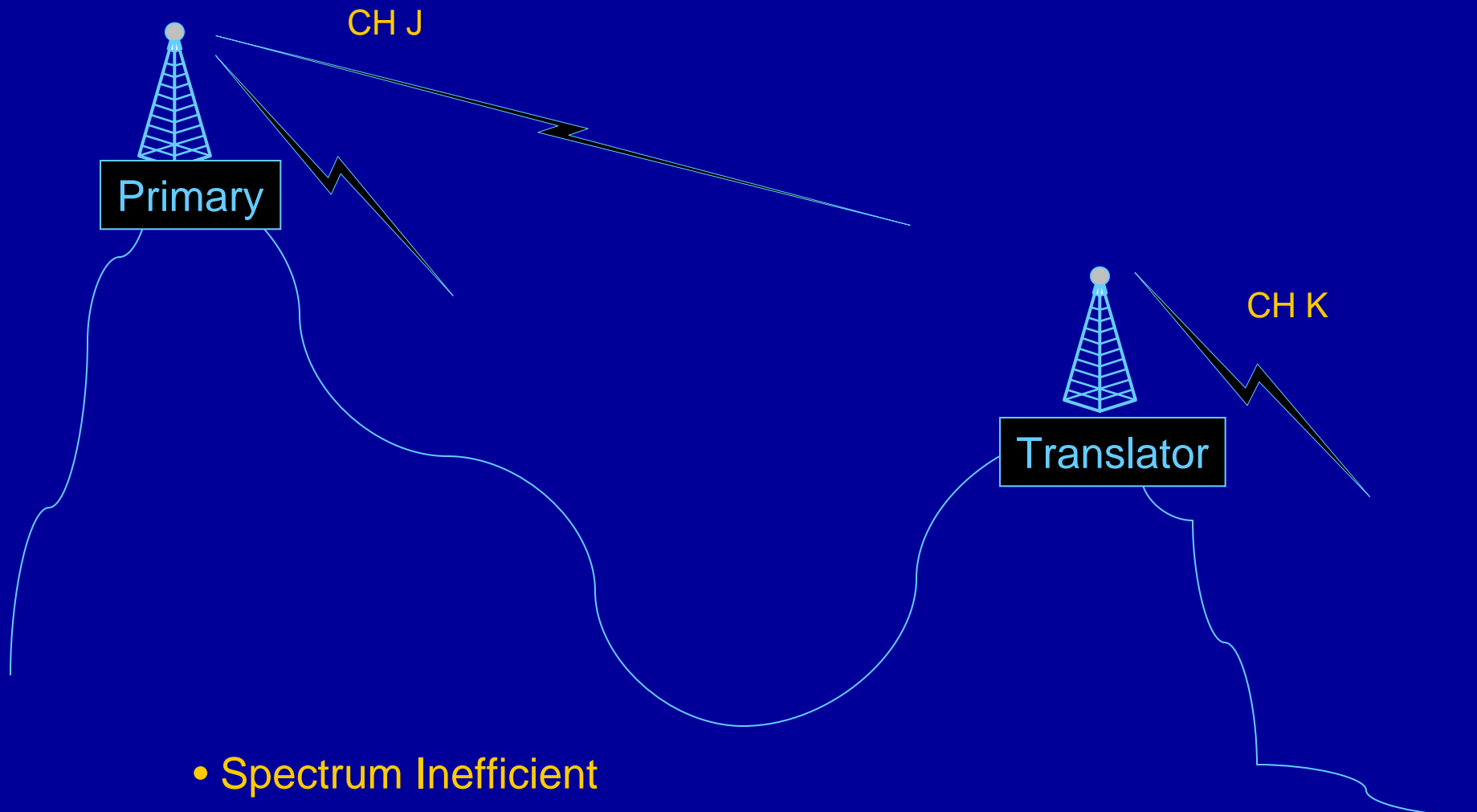
## Auto Linear Pre-Correction

- 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

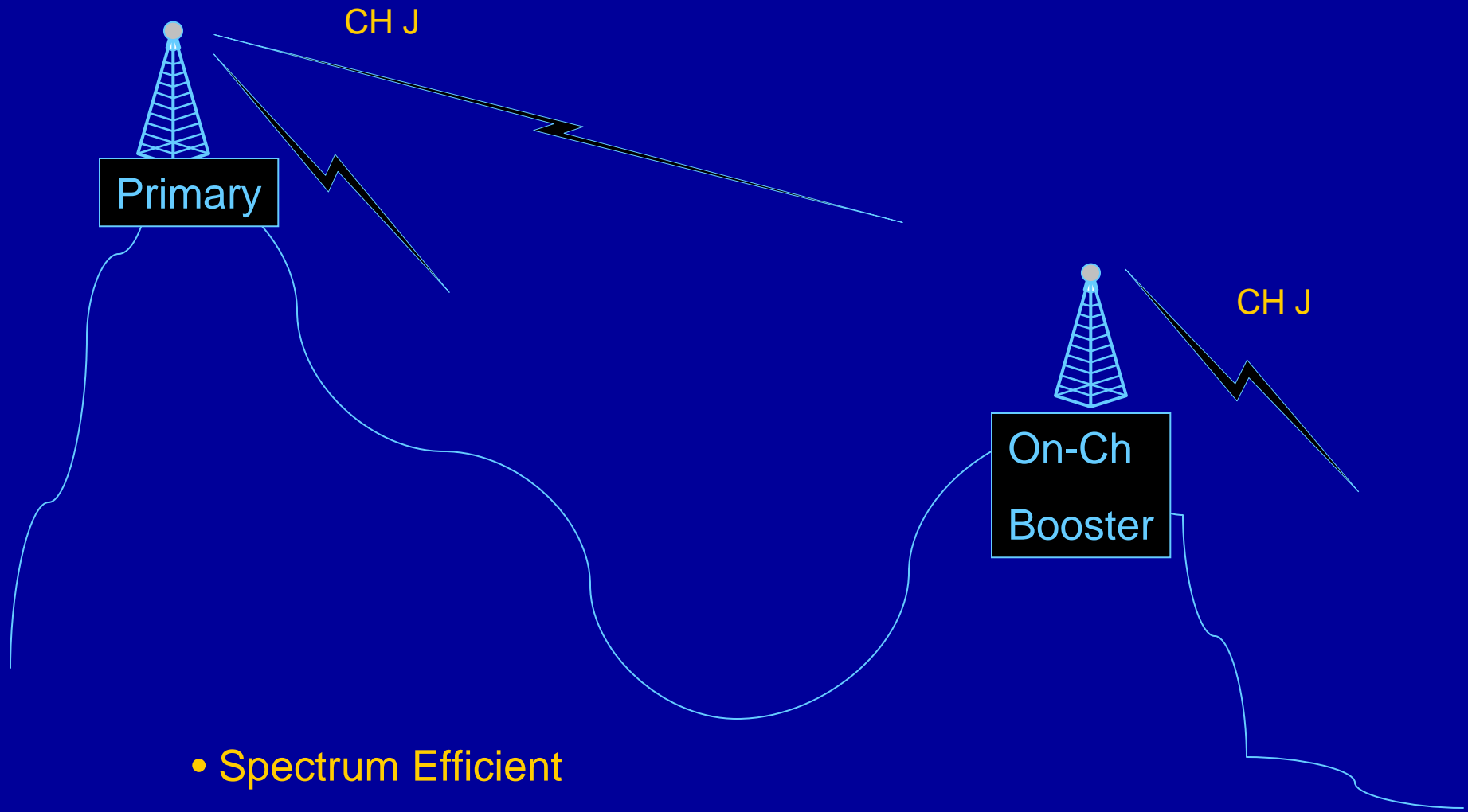


- Spectrum Inefficient

# Digital On-Channel Booster

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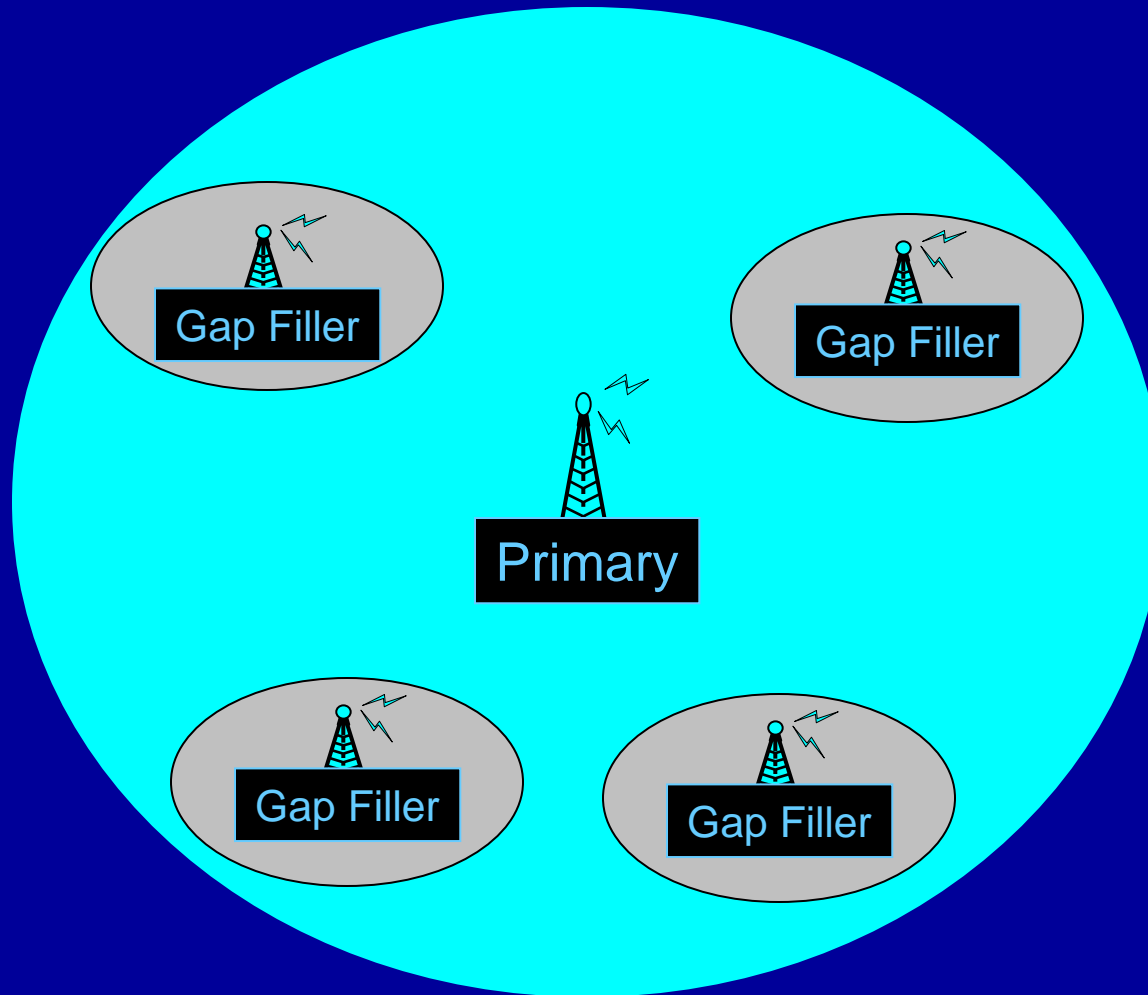
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# Digital On-Channel Booster - Gap Fillers

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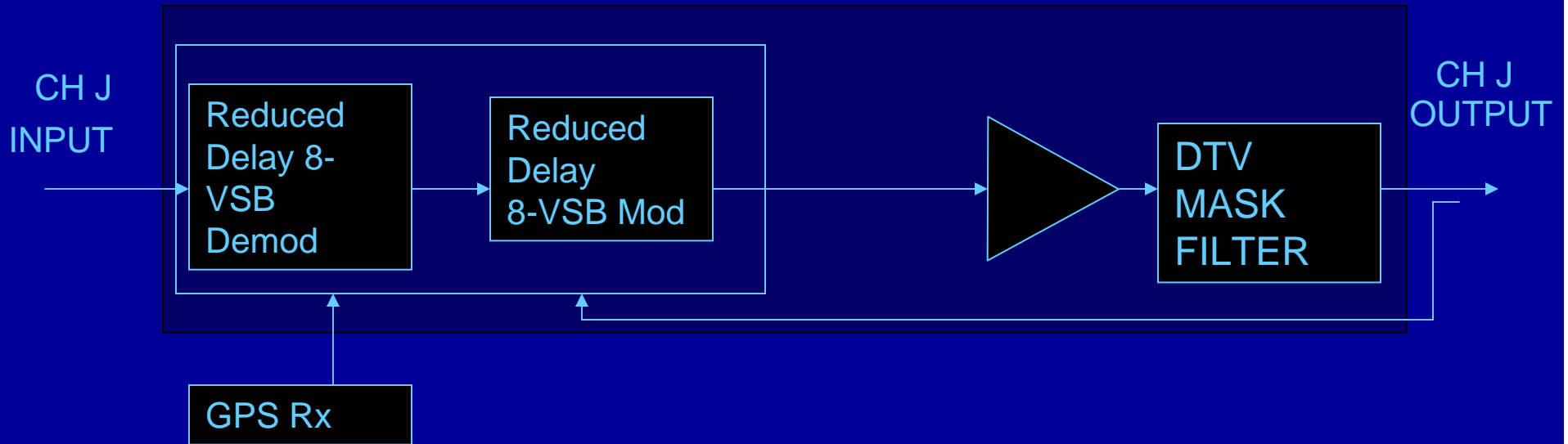


- Use Microwave Eqpt to connect all the Gap Fillers with the Primary Transmitter
- Synchronize the Gap Fillers to the Primary

# Digital 8-VSB On-Channel Booster

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

# Summary

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

# Thank you

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