**COM2000 HD Head end System Definition**

- **COM2000 System:**
  - Consists of a group of DIRECTV COM46 receivers working together in a high density package to create a DIRECTV IP and/or QAM modulated video solution Headend

- **System elements**
  - QAM6 Edge QAM (for coax distribution)
  - RF Distribution Equipment (SWM-8, 16 or 32 - Not Pictured)

- **The number of COM46 in a COM2000 System can scale from 1 to 6 for each chassis**
  - Each COM46 provides the capability to source 8 HD or SD channels of DIRECTV content
  - Each COM46-FLX provides the capability to source 8 SD channels of DIRECTV content & upgradeable to 8 Pro:Idiom encrypted HD Channels at a later date
COM1000 & 2000 Evolution

Q1 2009

- Aggregation Switch
- COM100 with COM24s
- COM120 RF Distribution
- External EdgeQAM

Q2 2011

- Integrated EdgeQAM
- Integrated Multi-switch
- SWM Compatible

Q2 2014 – COM2000

- 2 QAM Slots
- COM360 with COM46 Cards and QAMS
- Up to 48 Channels per Chassis
- 3RU
- Dual Gigabit Ethernet Ports
- Up to 6 COM46, COM46FLX, COM24 or COM24FLX Cards

Twice the Channel output and 1RU Smaller!
System Components – COM360

- COM360 Chassis
  - (2) Gigabit User Defined Ethernet Ports
  - (2) QAM Slots
  - Provides 3 RU rack mounted enclosure and power supply
  - Backplane provides power distribution and integrated Gigabit Ethernet switch
  - Redundant fans for cooling
**System Components – COM46**

- **COM46 Receiver Card**
  - Receives Satellite RF stream
  - Removes DIRECTV’s encryption
  - Applies Pro:Idiom digital content protection
  - Supports 8 DIRECTV channels
  - Outputs IP video in UDP or RTP formats
  - Remote software upgrades and management
  - LED blinking sequence provides front panel diagnostics
  - Only supports SWM RF plants
System Components – QAM6 & SWQAM2

• QAM6 & SWQAM2
  – Cost effective, scalable solution for a variety of channel counts
  – Reduced feature set specific to hospitality market
  – QAM6 supports 6 QAM @ 256 with single RF output - Max 12 QAM with update keys
  – Two channel upgrade keys can be purchased: Mdl # SWQAM2
  – J.83 Annex B, frequency range 54Mhz - 860 MHz
Accessory Components – ATSC-8

- **ATSC - 8 Over the Air Tuner**
  - Receives local ATSC Over-the-Air channels
  - IP output to the COM2000 system
  - 8 available ATSC digital tuners
  - Control and configured via COM46 or COM46-FLX simple web based interface
  - Pro:Idiom Compatible
Accessory Components – NTSC-8

NTSC-8 Features:

Eight channel agile NTSC modulator
  Two agile blocks of four consecutive NTSC channels

HD content from COM46 receivers
  Simultaneously output to both QAM (Primary output) and NTSC-8 (secondary output) from each tuner

1RU chassis, separate from the COM2000
Accessory Components - DCI401MCS

- **DCI401MCS HD DTA**
  - Now with IPG*
  - QAM input
  - HDMI, RF outputs
  - Pro:Idiom DRM decode
  - Virtual Channel Support
  - Channel Maps & changes auto directed from Headend
  - On screen UI capable of showing ‘On Now’ and ‘On Next’ data from PSIP broadcast
  - Simple RF remote control: Ch up/down, TV on/off and volume control*
  - Can receive SW updates advertised on QAM plant from Technicolor headends
  - Small form factor (4.33” x 0.96” x 3.19”) for behind TV mounting options

*Requires firmware 1.22.6 & COM46 running firmware 03.03.15*
COM46 - Electronic Program Guide

- Can Integrate all DIRECTV channels
- SD SMATV & local Off-Air as long as they are in the APG
- Allows for static data entry for sources not in the APG
- Provides upcoming programming information
- Allows for DIRECTV & End Customer branding

<table>
<thead>
<tr>
<th>Time</th>
<th>Channel</th>
<th>Program</th>
<th>Channel</th>
<th>Program</th>
</tr>
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<tbody>
<tr>
<td>Wed 12/15</td>
<td>7:00 p.m</td>
<td>Quiet Time</td>
<td>7:30 p.m</td>
<td>Red Slippers</td>
</tr>
<tr>
<td>2 LA2</td>
<td></td>
<td></td>
<td>4 LA4</td>
<td>The Fiesty Black Cat</td>
</tr>
<tr>
<td>5 LA5</td>
<td>Local News</td>
<td>Beach City Fun</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 LA7</td>
<td>Helicopter Cops</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 LA9</td>
<td>Sierra Quest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 SPKE</td>
<td>Batman Begins</td>
<td></td>
<td>11 SHO</td>
<td>Tougher in Alaska</td>
</tr>
<tr>
<td>12 HBO</td>
<td>All My Children</td>
<td></td>
<td></td>
<td>Modern Marvels</td>
</tr>
<tr>
<td>14 REAL</td>
<td>Judge Alex</td>
<td>NCIS</td>
<td></td>
<td>Emotions</td>
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</table>
## COM2000 Key Feature Summary

<table>
<thead>
<tr>
<th>FEATURES</th>
<th>BENEFITS</th>
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<tbody>
<tr>
<td>Cost effective solution to add incremental HD and SD</td>
<td>Scalable and modular design reduces overall cost per channel as HD channels increase due to</td>
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<tr>
<td>channels</td>
<td>demand and availability.</td>
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<tr>
<td>Plug &amp; Play Architecture</td>
<td>Reduces onsite time of installation and configuration as well as adding additional channels to</td>
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<td>existing system.</td>
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<td>Integrated Web Interface</td>
<td>Simplifies configuration and support, while also allowing for system diagnostics and remote</td>
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<td>management, decreasing truck rolls and operational support costs.</td>
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<tr>
<td>High Density Modular Design</td>
<td>Designed as a scalable blade/server architecture with the ability to support up to 48 HD or</td>
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<td>SD channels, or a combination of these while only occupying 3 RU of rack space.</td>
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<tr>
<td>QAM6/SWQAM2 integrated Scalable EdgeQAM</td>
<td>6 QAM @ 256 with single RF output. Cost optimized feature set specific for Hospitality</td>
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<td>market to lower overall system cost with tightly coupled COM46/QAM6 configuration to reduce</td>
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<td>system complexity and installation. Cost effective and scalable solution for a variety of</td>
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<td>Channel counts and HD/SD hybrid systems.</td>
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<tr>
<td>COM46-FLX Receiver</td>
<td>Outputs 8 channels of SD digital in the clear providing superior picture quality over Analog</td>
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<td>SMATV while using less than half the power. Allows COM2000 to do multiple mixes of HD and SD</td>
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<td>in a single chassis! Future proof software upgradable to 8 Channels of HD!</td>
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<td>SWM Capability</td>
<td>Eliminates B-band converters and multi-switches allowing increase control over input power</td>
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<td>levels and better Carrier-to-Noise Ratio (CNR) performance.</td>
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<tr>
<td>Backwards &amp; Forwards Compatibility</td>
<td>The COM46 &amp; COM46-FLX receiver blades can both be used in the COM200 chassis of a COM1000</td>
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<td>as well as the COM24 &amp; COM24-FLX can be used in the new COM360 chassis of the COM2000. This</td>
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<td>compatibility lends to easy upgrades of existing COM1000 properties as well as provides</td>
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<td>unique channel counts in a COM2000.</td>
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<tr>
<td>Multi-network compatible</td>
<td>Supports both RF and IP networks separately or simultaneously!</td>
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<tr>
<td>Environmental</td>
<td>FCC tested as Commercial Grade Equipment (designed for harsh environmental conditions) with</td>
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<td>low energy consumption while providing the more channels in a smaller footprint.</td>
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<tr>
<td>Electronic Program Guide</td>
<td>Guests can view available channels and programs currently playing. The property’s logo can</td>
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<td>also be included on the guide for brand exposure.</td>
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**COM2000 Talking Points**

- **Reduced Cost**
  - Half the price of COM1000

- **DIRECTV’s Second Generation, Commercial Head End Product**
  - DIRECTV is the market leader in L&I technology
  - Proven, reliable product and technology; not a Beta test at the property’s expense
  - Conditional access, reliability, and performance have all been proven since 2008
  - We welcome DISH to the party we have been hosting since 2008

- **More Channels in Less Space**
  - 8 HD channels per blade - 400% improvement over COM1000
  - 48 HD channels in 3 RUs (5.75”), 96 HD channels in 6 RUs (10.5”) - 63% improvement over COM1000
  - COM2000 platform is easy to expand (in increments of 48) and can support hundreds of channels - largest installed system is over 400 channels.
COM2000 Talking Points

• Feature Rich
  – Improved Local Management through an integrated web interface
  – Support, system configuration, and system tools
  – New Remote management interface
  – Manage all your properties from a one system status/dashboard interface
  – Local content insertion
  – Cameras, property marketing/sizzle reels, et al.
  – Over-the-air insertion

• Easy to Install
  – Developed on same platform as COM1000
  – Dealers/Installers are familiar with product
  – Backward compatible to allow for easy HD expansion with existing customers
  – Plug and Play platform

• Environmentally Friendly
  – More efficient design than COM1000
  – FCC tested as Commercial Grade Equipment (designed for harsh environmental conditions) with low energy consumption
Thank you