IP Microwave Connectivity
GTR8000 Bases

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The Motorola MLC 8000

• Complete IP Solution for Analog Voting and Simulcast
  o Uses UDP Unicast

• Works with GTR8000, Quantar, Status Tone Receivers
  o Uses status tone voting
  o GTR8000 and Quantar simulcast baseband composite input

• MLC8000 Can be Purchased Four (4) Ways
  o Configuration 1: Analog Voting Gateway OR Analog Voter
  o Configuration 2: Analog Simulcast Control and Gateway
  o Configuration 3: V.24 Gateway for Digital Operation
  o Configuration 4: Mixed Mode P25 and Analog Voter
The Motorola MLC 8000
The Motorola MLC 8000
The Motorola GTR 8000

- Analog FM
- P25 Phase I Digital
- P25 Phase 2 Digital
- Backward Compatible to Quantar
MLC 8000 Configurations

- **Configuration 1: Analog Voting Gateway OR Analog Voter**
  - Gateway for up to 4 status-tone receivers at a single site
  - Takes status tone voting from any status tone receiver
  - When used as a voter, accepts 4-wire console input
    - With console priority

- **Configuration 2: Analog Simulcast Control and Gateway**
  - Provides simulcast timing and control for a single transmitter
  - Provides status tone voting input for a single receiver

- **Configuration 3: V.24 Gateway for Digital Operation**
  - GCM8000 Comparator
  - Quantar or GTR8000 receiver

- **Configuration 4: Mixed Mode P25 and Analog Voter**
  - Paired with a GCM8000 digital comparator
  - Status tone voting input from analog receivers
  - V.24 gateway for Motorola digital receivers
Block Diagram: Single Site, 3 Channels

- IP Microwave
- Motorola GCM8000 Router
- Motorola 2610-24 Managed Switch
- Spectracom GPS Master Oscillator
- Motorola MLC 8000
- Motorola GTR 8000 Transceiver
- Motorola MLC 8000
- Motorola GTR 8000 Transceiver
- Motorola MLC 8000
- Motorola Quantar Transceiver

Channel #1: All GTR8000
Channel #2: All GTR8000
Channel #3: All Quantar
SpectraCom SecureSync

Programmable TTL Output
The Programmable TTL Output option module card provides four (4) programmable square wave outputs for the SecureSync platform.

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td>4</td>
</tr>
<tr>
<td>Signal Type and Connector</td>
<td>TTL (BNC into 50 ohms)</td>
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<tr>
<td>Programmable Period</td>
<td>100 ns to 1,000,000,000 ns in 5 ns steps</td>
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<tr>
<td></td>
<td>100 ps to 40,000,000 ps in 1 µs steps</td>
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<tr>
<td>Pulse Width Range</td>
<td>20 ns - 900 ms in 20 ns steps</td>
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<tr>
<td>Rise Time to 90% of Level</td>
<td>&lt; 40 ns</td>
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<tr>
<td>Maximum Number of Cards:</td>
<td>6</td>
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</tbody>
</table>

Ordering Information
1204-17: Programmable TTL output module
IP Microwave

- Separate LAN or VLAN for Radio-Only Traffic
  - ‘Dedicated’ bandwidth for radio-only traffic
  - All other traffic on separate LAN/VLAN with a maximum bandwidth

- Exalt EX-4.9i Microwave (4.9 GHz)
  - All indoor unit
  - No hot standby

- Aviat Eclipse Microwave (6 GHz and 10/11 GHz)
Summary – Simulcast by Communications Service

• Minimize the Variables
  - Non-Variable Reliable Backhaul – IP Microwave
  - Keep Identical Audio Response Over Time – System Components
  - Eliminate Time Delay Changes – Account for Maximum IP Time Delay
  - Advantages over Self-Adjusting Systems

• Simplified Design and Optimization
  - Motorola MLC 8000
  - Motorola GGM 8000 Router and 2610-24 Managed Switch

• Motorola Quantar and GTR8000
  - GTR 8000 has the Same Analog Simulcast Baseband Input as the Quantar
  - Cannot Mix Quantar and GTR 8000 on the Same Channel

• Simulcast Narrowbanding Experience in 2013/2014
  - Several System Contracts due to Narrowband Coverage Loss