Compact Low Power RF Driver:  
For Acousto-optic Q-Switch or Modulator

QCXXX-YYDC-ZZZ-AAV
Former Model Numbers:
R390XX-YYDMZZZ & MQC0XX-YYDCZZZ-AAV

Description:

The QCXXX-YYDC-ZZZ-AAV module is a compact Low Power RF Driver, designed to drive an AO Q-Switch or AO Modulator. The unit has two digital modulation inputs: Fixed and Variable. These controls allow the customer to issue a pulse command of a "Fixed" pulse width, the duration determined by the Driver's pulse width control, settable by the customer, or issue a "Variable" pulse command, the duration determined by the input signal's pulse width. The output power is controlled by the analog input, where the mode of operation is defined by ZZZ = A05 normal analog mode, or R05 analog switched to full RF mode or a triggered RF Ramp Down mode where ZZZ = FPS first pulse suppression mode or PPK pre-pulse kill mode. Other variations of these modes are also available. The choices of Frequency (XXX), Output Power (YY), and Power Control (ZZZ) option are "Factory Set" when ordered. This driver has a Zero Crossing function where the output pulse can be synchronized to the zero crossing point of the RF Energy. When enabled the pulse to pulse stability is improved.


Key Features:

- 24, 27.12, 40.68, 68, 80, or 110 MHz RF Frequency (XXX)
- 0.01% Quartz Stabilized
- Up to 24 watts RF power output (YY)
- Two TTL Digital Modulation Inputs: fixed and variable pulse width.
- Up to 1 MHz pulse rate in Q-Switch applications.
- Up to 10 MHz pulse rate in pulse picking applications
- Analog Modulation or Triggered RF Ramp Down Mode (ZZZ)
- Synchronization to RF by ‘Zero cross’
- Fault Protection on Low Power, High Power, and High VSWR
- Operates on 12, 15 or 24 VDC (AAV) (Factory set)

Applications:

- Powering an Acousto-Optic Q-Switch used to spoil the “Q” of a CW laser so as to output an intense pulse of light.
- Powering an Acousto-Optic Modulator to pick pulses out of an optical pulse train
## QCXXX-YYDC-ZZZ
### SPECIFICATIONS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Frequency:</td>
<td>$XXX = 024, 027, 041, 068, 080, \text{ or } 110 \text{ as standard }$ $24.00, 27.12, 40.68, 68.00, 80.00, \text{ or } 110.00 \text{ MHz } \pm 0.01%$</td>
</tr>
<tr>
<td>Spurious Levels:</td>
<td>-50 dBc Maximum</td>
</tr>
<tr>
<td>Harmonic Distortion</td>
<td>-20 dB Maximum for units with output power ≤ 15 watts -15 dB Maximum for units with output power &gt; 15 watts</td>
</tr>
<tr>
<td>Modulation Input:</td>
<td>TTL Levels, (Minimum Pulse Width 50 ns) Triggered on Rising Edge Triggered on Falling Edge</td>
</tr>
<tr>
<td>Mode In Fixed (pin 3)</td>
<td>Standard Inverted digital input option (NEG)</td>
</tr>
<tr>
<td>Mode In Variable (pin 5)</td>
<td>Standard Inverted digital input option (NEG)</td>
</tr>
<tr>
<td>Extinction Ratio:</td>
<td>50 dB Minimum</td>
</tr>
<tr>
<td>RF Rise Time 10% to 90%, into 50 ohm resistive load</td>
<td>≤ 35 ns</td>
</tr>
<tr>
<td>RF Fall Time: 90% to 10%, into 50 ohm resistive load</td>
<td>≤ 35 ns</td>
</tr>
<tr>
<td>Modulation Repetition Rates:</td>
<td>1 Hz to 1 MHz for Fixed Modulation DC to 10 MHz for Variable Modulation</td>
</tr>
<tr>
<td>Fixed Modulation Output Pulse Width Adjustment Range:</td>
<td>1 to 20 μs, Customer Adjustable</td>
</tr>
<tr>
<td>Available Pulse Suppression Modes:</td>
<td>$ZZZ = \text{Mode}$</td>
</tr>
<tr>
<td>Modulation Operating Mode is &quot;Factory Set&quot; Internally.</td>
<td>FPS = First Pulse Suppression See Figure 2</td>
</tr>
<tr>
<td>FPS Trigger (pin 2) for Pulse Suppression</td>
<td>TTL Levels Triggered on Rising Edge</td>
</tr>
<tr>
<td>for Units Configured with FPS, PPK:</td>
<td>Triggered on Falling Edge</td>
</tr>
<tr>
<td>Analog in (pin 6) for Power Control</td>
<td>0 to 5 volts Analog. Input Impedance 1.5kΩ</td>
</tr>
<tr>
<td>for Units Configured with A05, R05:</td>
<td>&lt; 3 watt dissipation in stand by mode.</td>
</tr>
<tr>
<td>Enable - Stand by Mode (pin 11)</td>
<td>TTL High or no connection = Normal operation</td>
</tr>
<tr>
<td>Zero Crossing Enable (pin 7)</td>
<td>TTL Low = Stand by Mode</td>
</tr>
<tr>
<td>Standard</td>
<td>Momentary TTL Low = Driver Reset - after fault is removed.</td>
</tr>
<tr>
<td>Active zero cross option (ZC)</td>
<td>Outputs 3.3 volt signal, inverted in ZC units.</td>
</tr>
<tr>
<td>Sync out (pin 1)</td>
<td>TTL high or no connection- disabled, TTL low-enabled</td>
</tr>
<tr>
<td>RF Power Output:</td>
<td>TTL high or no connection- enabled, TTL low-disabled</td>
</tr>
<tr>
<td>YY watts where YY = 2 to 24 watts</td>
<td></td>
</tr>
<tr>
<td>Output Impedance:</td>
<td>50 Ω</td>
</tr>
<tr>
<td>Supply Voltage:</td>
<td>+12, +15 VDC or +24 VDC (factory set)</td>
</tr>
<tr>
<td>Supply Current:</td>
<td>≤ 3 amps</td>
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</tbody>
</table>
OPERATING TEMPERATURE: +10 to +55 °C, non-condensing

Contact Cooled

MAXIMUM RATINGS:

Supply Voltage: +27 volts
Power Output: No DC Feedback Allowed
Storage Temperature: -20 to + 85 °C

RF POWER (watts)

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>24.00</th>
<th>27.12</th>
<th>40.68</th>
<th>68</th>
<th>80</th>
<th>110</th>
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</thead>
<tbody>
<tr>
<td>Supply Voltage (V)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>12</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
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<tr>
<td>15</td>
<td>24</td>
<td>24</td>
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<td>20</td>
<td>20</td>
<td>10</td>
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<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>10</td>
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CONNECTORS AND MECHANICAL:

RF Output Connector: SMA Female
Power and Control Connector: Molex 0430451221
Mating Connector: Molex 0430251200 with 0430300008 crimp terminals
Pinout:

1. SYNC
2. FPS TRIGGER
3. MOD IN FIXED
4. GROUND
5. MOD IN VARIABLE
6. MOD IN ANALOG
7. ZERO CROSS ENABLE
8. LP - Low Power Fault output
9. HP – High Power Fault output
10. High VSWR – Load Fault output
11. ENABLE
12. + 12, + 15, or +24 VDC Factory Set.

ADJUSTMENTS:

RF Power Level Adjustment Adjusts the output RF Power – clockwise increases power output.
LP – Low Power Set Point Adjusts the minimum power threshold. The LP Fault output goes LOW if the output power less than this level.
HP – High Power Set Point Adjusts the maximum power threshold. The HP Fault output goes LOW if the output power is greater than this level.
High VSWR Set Point Adjusts the module’s tolerance for a mismatched load connected to RF Out. If a mismatch is detected, the HVS WR Fault output goes LOW, the status LED will change to YELLOW, and the driver will cease output until reset by momentarily entering stand by mode.
Pulse Width Adjusts the length of time the driver outputs no RF energy after receiving a Fixed Input trigger. 1µs to 20µs.

The following adjustments are used on units configured with FPS or PPK:

FPS Start Adjusts the initial power level of the first pulse.
FPS Slope Adjusts how quickly the RF pulses return to their normal level after the FPS has been triggered. 20 µs to 300 µs.
FPS Window Adjusts the duration of the suppression pulse cycle. 20 µs to 300 µs

STATUS INDICATOR:

Red Normal Operation
Green Stand By Mode
Yellow Fault Condition
Mechanical Dimensions:
Dimensions in inches and [mm]

![Diagram of mechanical dimensions](image-url)
As part of our policy of continuous product improvement we reserve the right to change specifications at any time.

FIGURE 2
FIRST PULSE SUPPRESSION (FPS) OPERATING MODE CONTROL DIAGRAM

Normal Trigger Polarity shown. Invert signals A, B, and C for NEG operation.
Normal Trigger Polarity shown. Invert signals A, B, and C for NEG operation.
FIGURE 4
ANALOG CONTROL (R05) SWITCHED TO RF OPERATING MODE CONTROL DIAGRAM

Normal Trigger Polarity shown. Invert signals A and B for NEG operation.
FIGURE 5
ANALOG CONTROL (A05) OPERATING MODE CONTROL DIAGRAM

Normal Trigger Polarity shown. Invert signals A and B for NEG operation.
FIGURE 6
ANALOG CONTROL (M05) WITH AOM COMPATIBLE OUTPUT CONTROL DIAGRAM

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Normal Trigger Polarity shown. Invert signals A and B for NEG operation.
Ordering Codes:
Example: QC027-20DC-A05-15V
A 27 MHz RF Driver with two TTL Digital Modulation inputs (fixed and variable pulse width) and an analog input (A05) which enables control of the RF output power. Designed to Drive an AO Q-Switch requiring 20 watts RF Power or less. Delivered as a RoHS compliant, contact cooled OEM Module.

Technical Assistance & Customization
Our Engineering and Sales team are available to discuss your requirements and will assist you in selecting the most appropriate acousto-optic Q-Switch/Driver combination for your application.