Gooch & Housego

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.

This product conforms to the requirements of the European Union Directive 2011/65/EU of the European Parliament and of the Council on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment.

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

As part of our policy of continuous product improvement we reserve the right to change specifications at any time

QCXXX-YYDC-ZZZ
SPECIFICATIONS

PARAMETER:	SPECIFICATION:

Output Frequency:
Where RF Frequency =   **XXX** = 024, 027, 041, 068, 080, or 110 as standard
      24.00, 27.12, 40.68, 68.00, 80.00,
      or 110.00 MHz ± 0.01%

Spurious Levels: -50 dBc Maximum

Harmonic Distortion   -20 dB Maximum for units with output power ≤15 watts
   -15 dB Maximum for units with output power >15 watts

Modulation Input:
   Mod In Fixed (pin 3)   TTL Levels, (Minimum Pulse Width 50 ns)
      Standard   Triggered on Rising Edge
      Inverted digital input option (NEG)   Triggered on Falling Edge
   Mod In Variable (pin 5)   TTL Levels
      Standard   HIGH = RF Off
      Inverted digital input option (NEG)   LOW = RF Off

Extinction Ratio: 50 dB Minimum

RF Rise Time 10% to 90%, into 50 ohm resistive load   ≤ 35 ns

RF Fall Time: 90% to 10%, into 50 ohm resistive load   ≤ 35 ns

Modulation Repetition Rates: 1 Hz to 1 MHz for Fixed Modulation
   DC to 10 MHz for Variable Modulation

Fixed Modulation Output Pulse Width Adjustment Range: 1 to 20 μs, Customer Adjustable

Available Pulse Suppression Modes:
Modulation Operating Mode is "Factory Set" Internally.

   ZZZ = Mode
   FPS = First Pulse Suppression   See Figure 2
   PPK = Pre Pulse Kill   See Figure 3
   R05 = RF Switched to Analog Control   See Figure 4
   A05 = Analog Control   See Figure 5
   M05 = Analog Control configured for AOM   See Figure 6

FPS Trigger (pin 2) for Pulse Suppression
   for Units Configured with FPS, PPK: TTL Levels
      Standard   Triggered on Rising Edge
      Inverted digital input option (NEG)   Triggered on Falling Edge

Analog in (pin 6) for Power Control
   for Units Configured with A05, R05:   0 to 5 volts Analog. Input Impedance 1.5kΩ

Enable - Stand by Mode (pin 11)   < 3 watt dissipation in stand by mode.
   TTL High or no connection = Normal operation
   TTL Low = Stand by Mode
   Momentary TTL Low = **Driver Reset** - after fault is removed.

Zero Crossing Enable (pin 7)
   Standard   TTL high or no connection- disabled, TTL low- enabled
   Active zero cross option (ZC)   TTL high or no connection- enabled, TTL low- disabled

Sync out (pin 1)   Outputs 3.3 volt signal, inverted in ZC units.

RF Power Output: **YY** watts where YY = 2 to 24 watts

Output Impedance: 50 Ω

Supply Voltage: +12, +15 VDC or +24 VDC (factory set)

Supply Current: ≤ 3 amps

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OPERATING TEMPERATURE:

+10 to +55 ^{0}C, non-condensing

Contact Cooled

The Driver must be attached to a heatsink capable of dissipating 36W @ 12V, 45W @ 15V, or 72W @ 24V

MAXIMUM RATINGS:

Supply Voltage:	+27 volts
Power Output:	No DC Feedback Allowed
Storage Temperature:	-20 to + 85^{0}C

RF POWER (watts)

Frequency (MHz)	24.00	27.12	40.68	68	80	110
Supply Voltage (V)						
12	10	10	10	10	10	10
15	24	24	24	20	20	10
24	24	24	24	24	24	10

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	7	ZERO CROSS ENABLE
2	FPS TRIGGER	8	LP - Low Power Fault output
3	MOD IN FIXED	9	HP – High Power Fault output
4	GROUND	10	High VSWR – Load Fault output
5	MOD IN VARIABLE	11	ENABLE
6	MOD IN ANALOG	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 HVSWR 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:

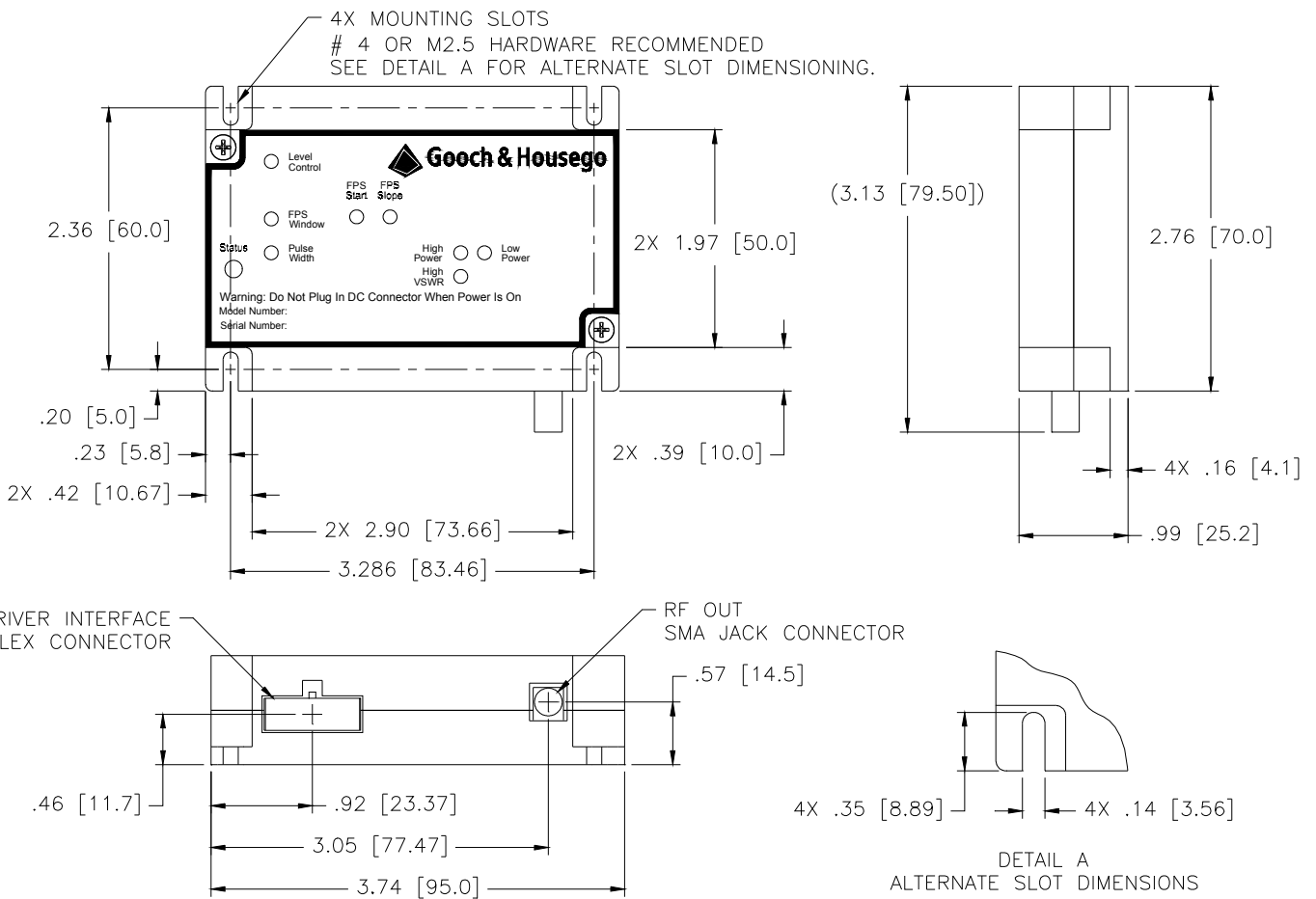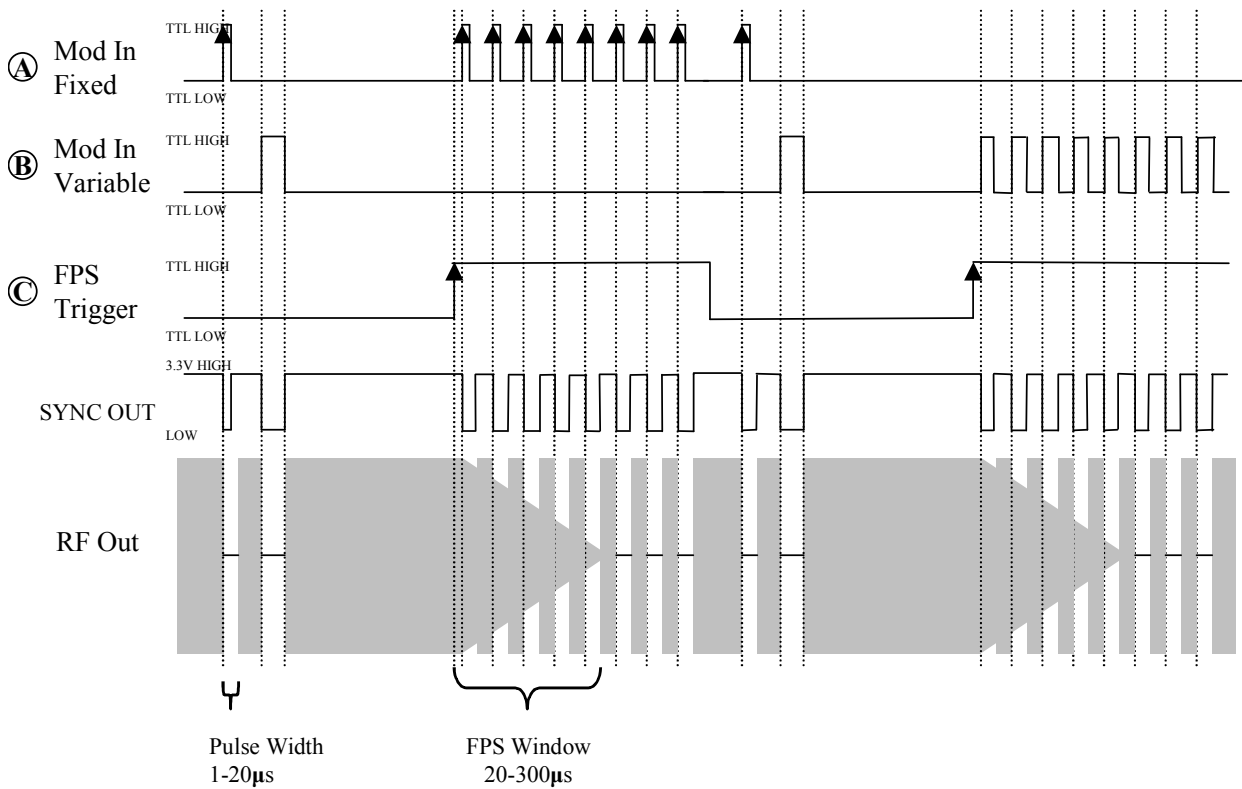|	
Red	Normal Operation
Green	Stand By Mode
Yellow	Fault Condition

Mechanical Dimensions:

Dimensions in inches and [mm]

4X MOUNTING SLOTS
4 OR M2.5 HARDWARE RECOMMENDED
SEE DETAIL A FOR ALTERNATE SLOT DIMENSIONING.

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Level Control
FPS Start   FPS Slope
FPS Window
Status   Pulse Width
High Power   Low Power
High VSWR
Warning: Do Not Plug In DC Connector When Power Is On
Model Number:
Serial Number:

2.36 [60.0]

2X 1.97 [50.0]

(3.13 [79.50])

2.76 [70.0]

.20 [5.0]

.23 [5.8]

2X .42 [10.67]

2X .39 [10.0]

2X 2.90 [73.66]

3.286 [83.46]

4X .16 [4.1]

.99 [25.2]

DRIVER INTERFACE
MOLEX CONNECTOR

RF OUT
SMA JACK CONNECTOR

.57 [14.5]

.46 [11.7]

.92 [23.37]

3.05 [77.47]

3.74 [95.0]

4X .35 [8.89]

4X .14 [3.56]
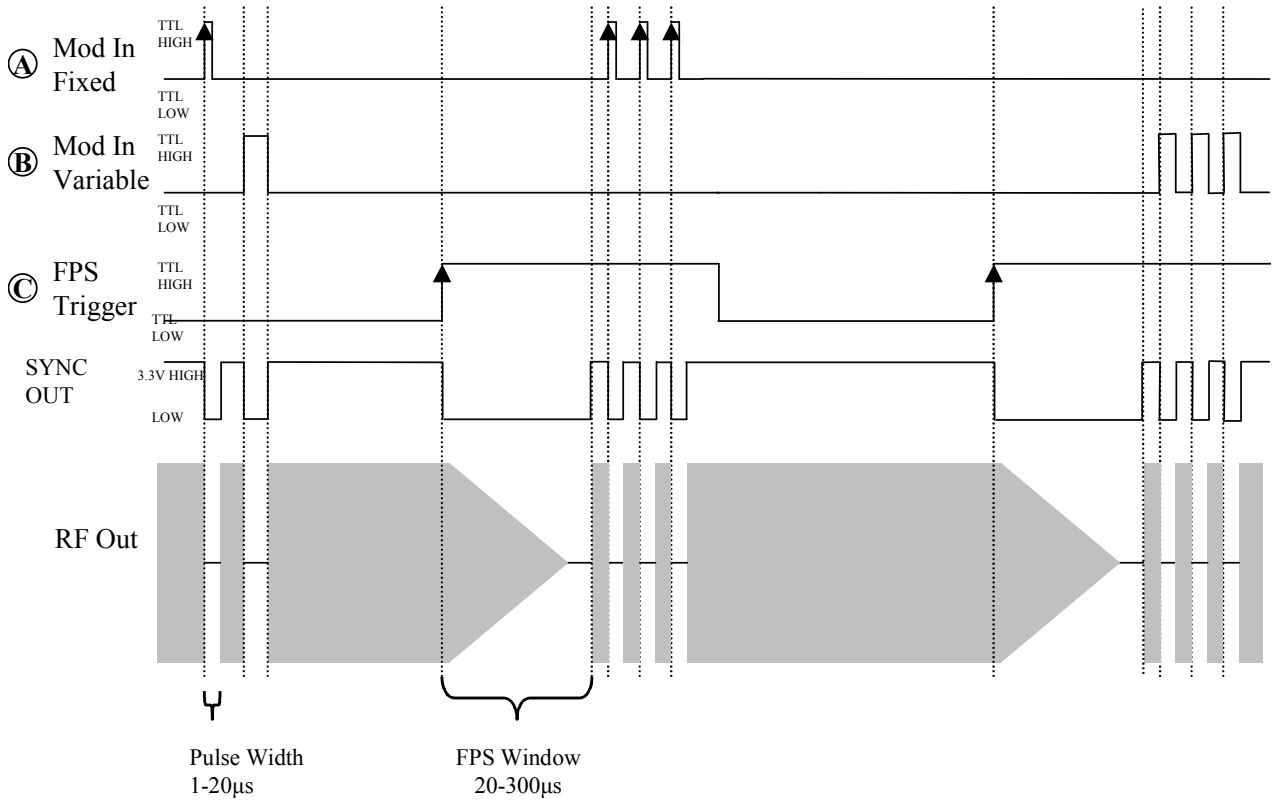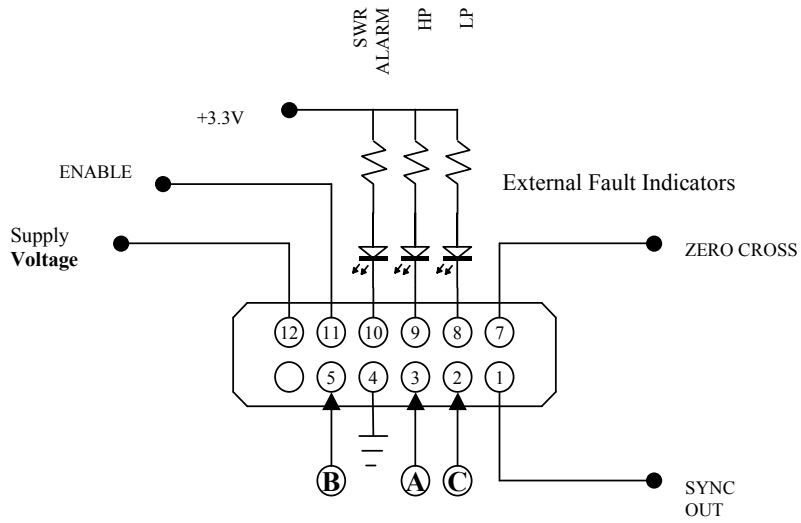
DETAIL A
ALTERNATE SLOT DIMENSIONS

FIGURE 2

FIRST PULSE SUPPRESSION (FPS) OPERATING MODE CONTROL DIAGRAM
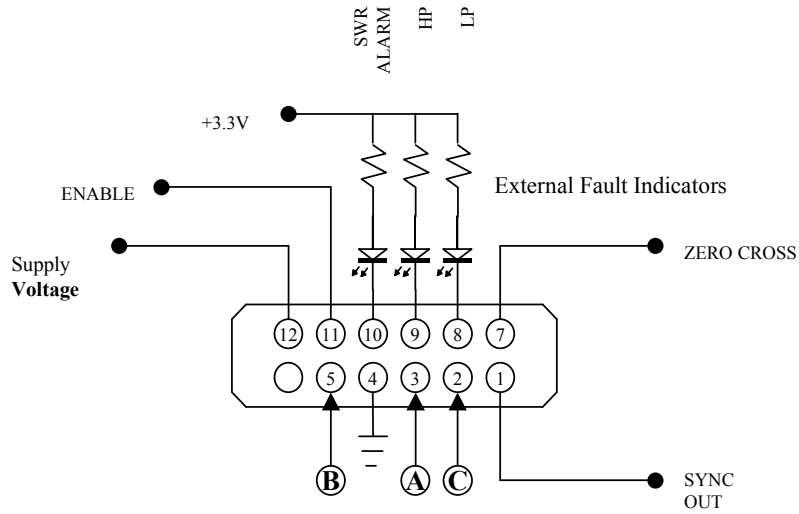
Normal Trigger Polarity shown. Invert signals A, B, and C for NEG operation.
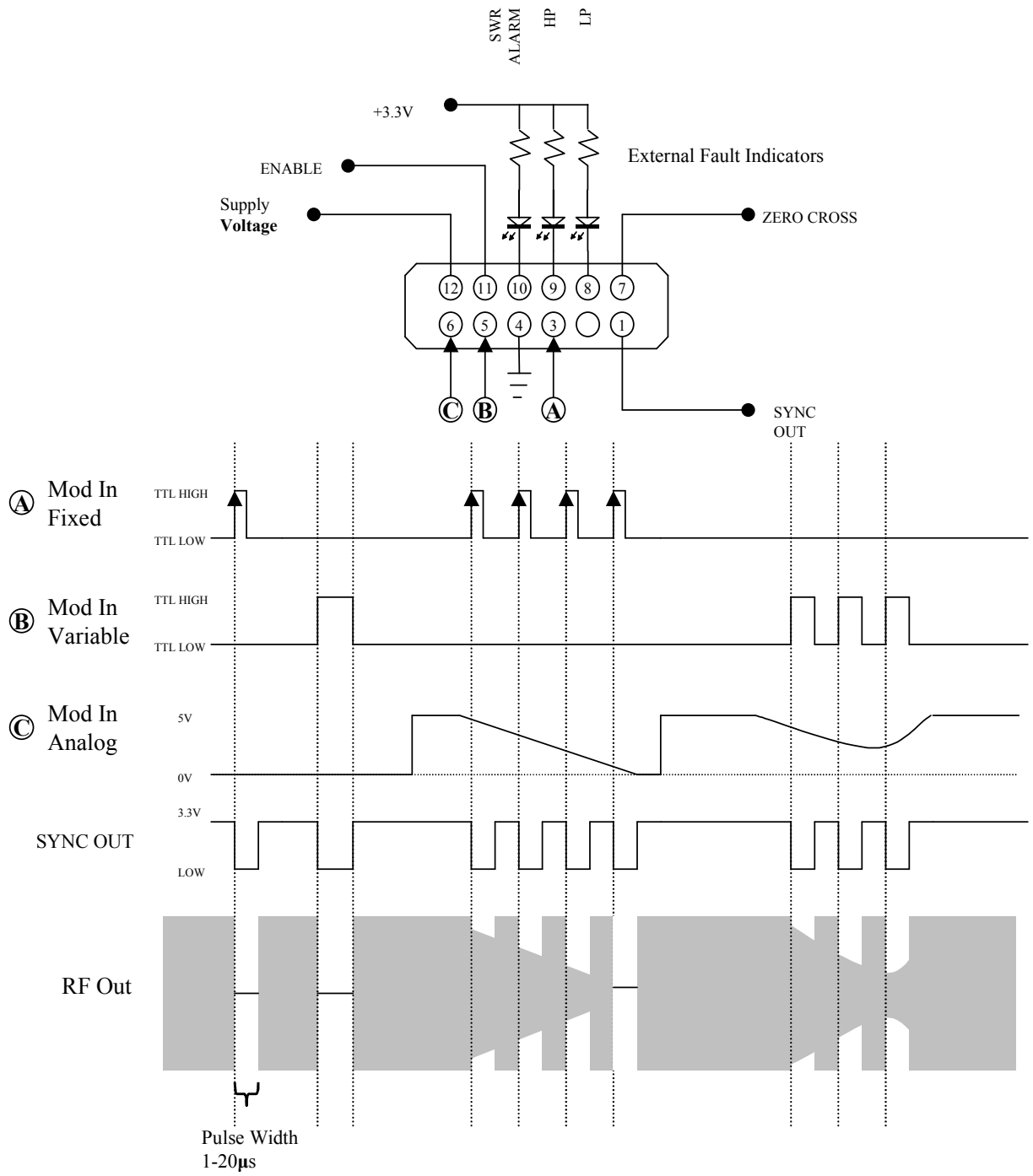
FIGURE 3

PRE PULSE KILL (PPK) OPERATING MODE CONTROL DIAGRAM

Normal Trigger Polarity shown. Invert signals A, B, and C for NEG operation.

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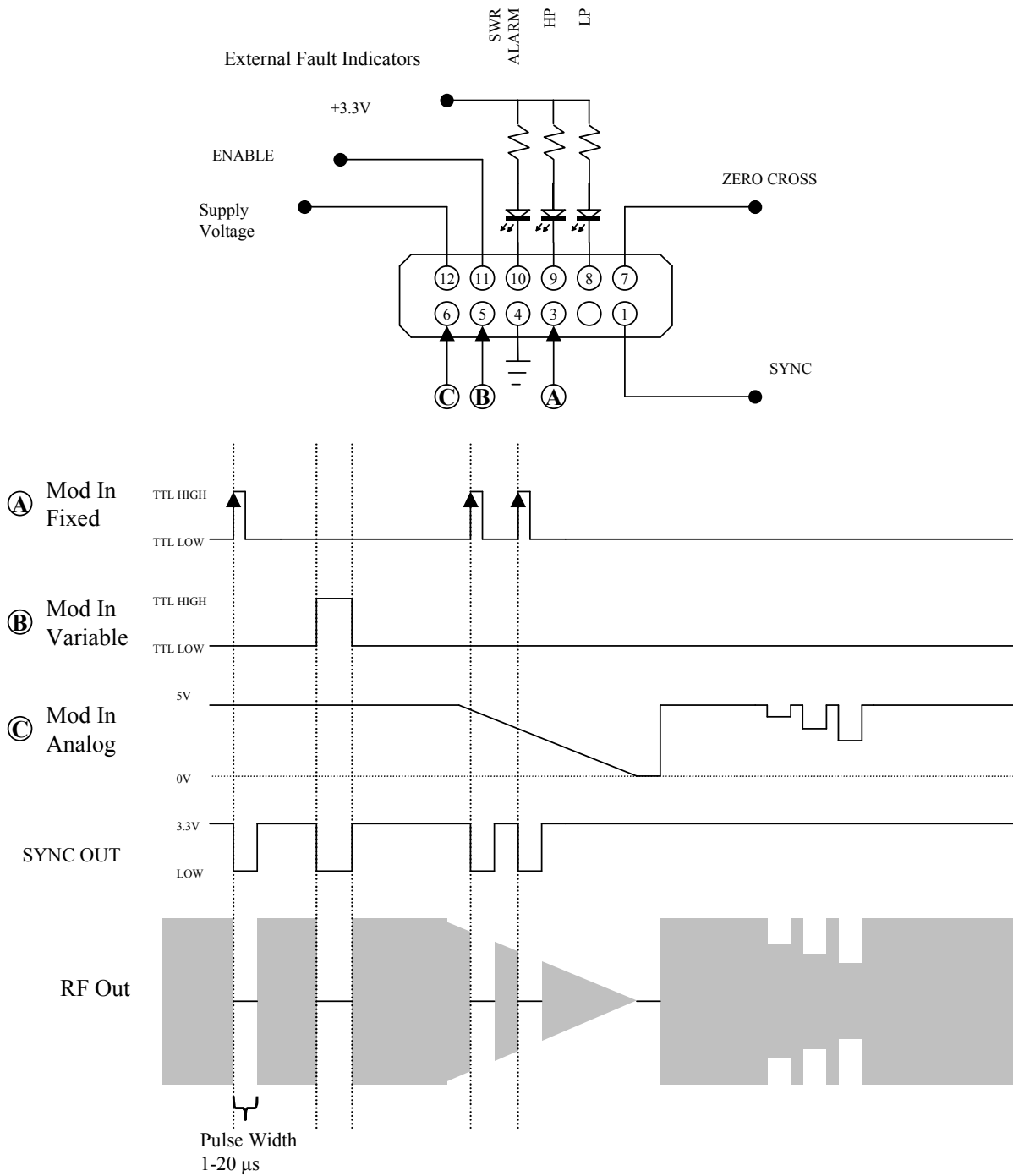# FIGURE 4

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.

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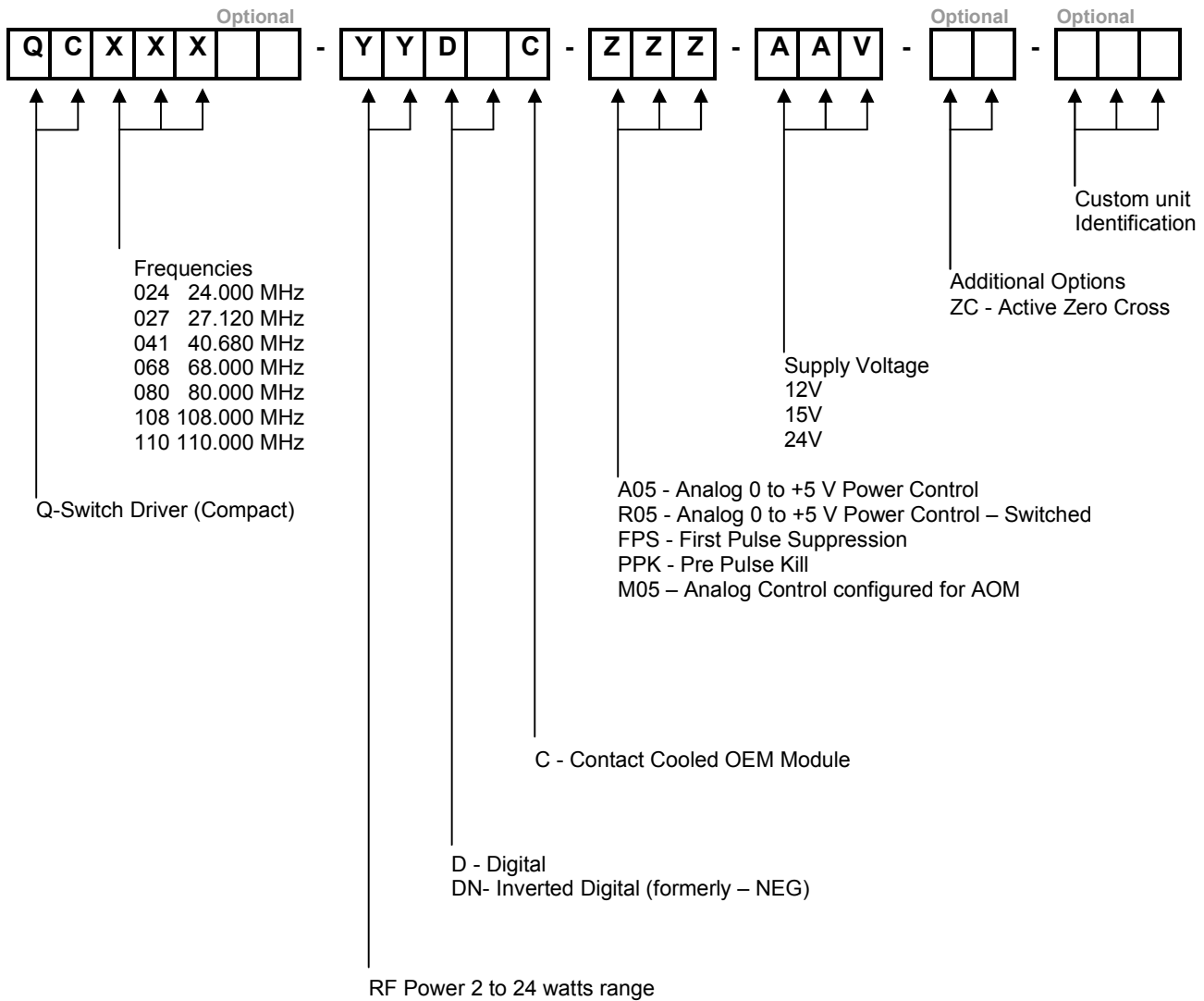
FIGURE 6

ANALOG CONTROL (M05) WITH AOM COMPATIBLE OUTPUT CONTROL DIAGRAM

Normal Trigger Polarity shown. Invert signals A and B for NEG operation.

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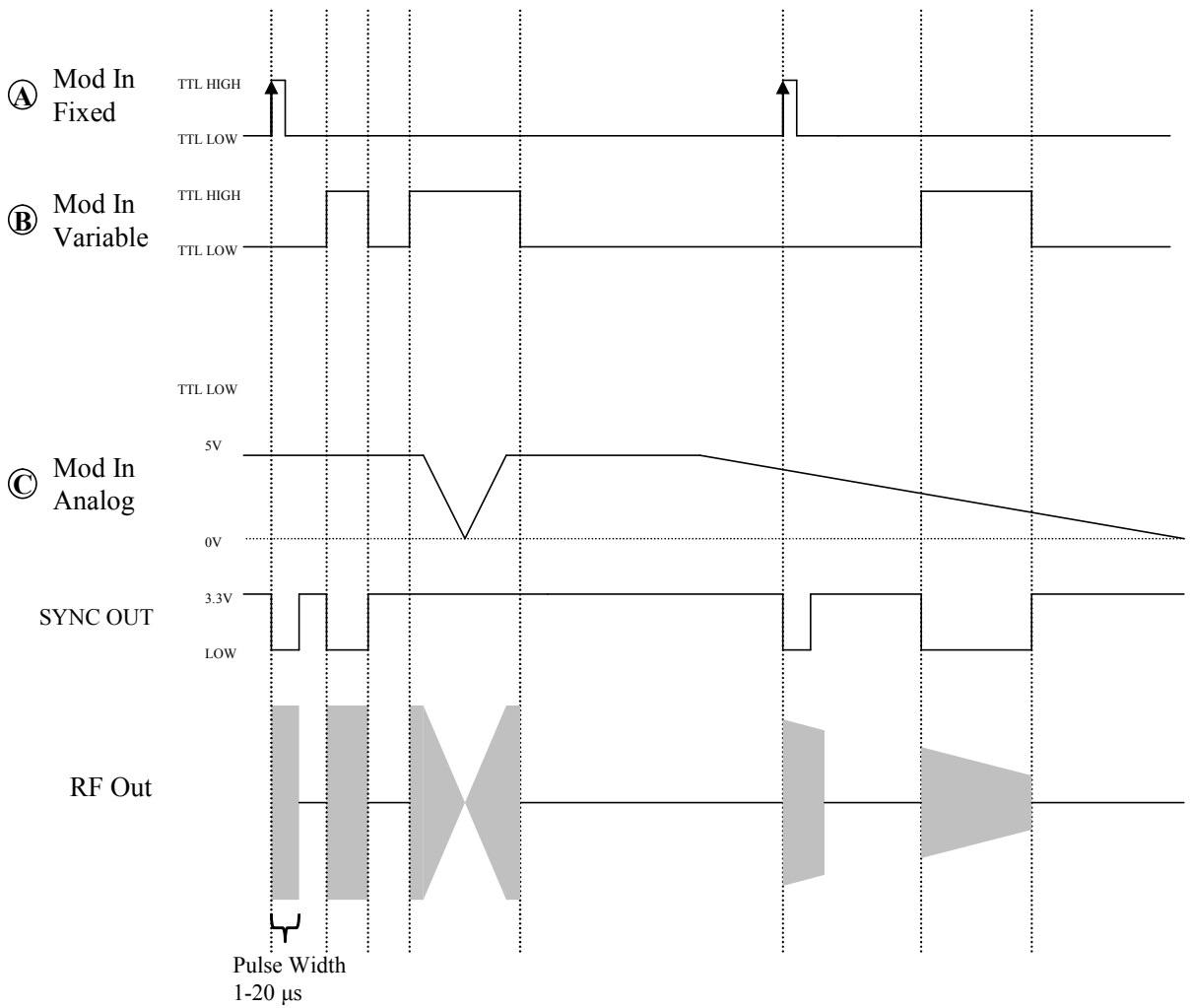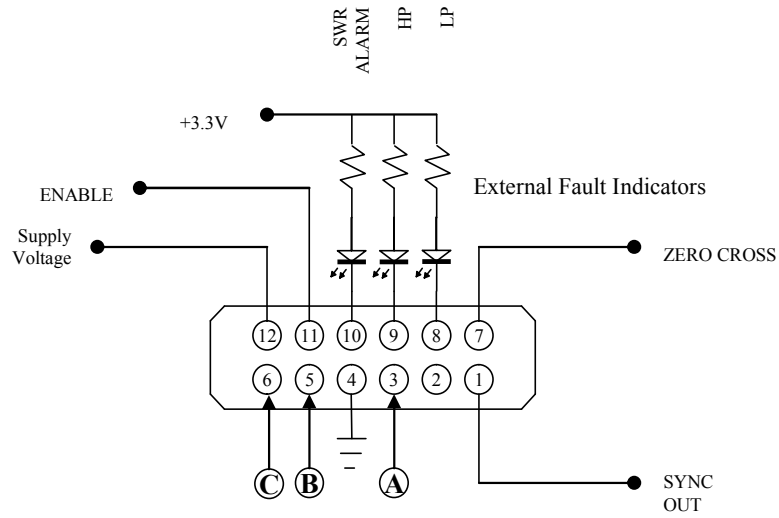
Ordering Codes:

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.

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Q	C	X	X	X		-	Y	Y	D	C	-	Z	Z	Z	-	A	A	V	-			-			

Optional (above 6th box)
Optional (above first trailing box)
Optional (above last trailing boxes)

Custom unit Identification

Frequencies
024 24.000 MHz
027 27.120 MHz
041 40.680 MHz
068 68.000 MHz
080 80.000 MHz
108 108.000 MHz
110 110.000 MHz

Q-Switch Driver (Compact)

Additional Options
ZC - Active Zero Cross

Supply Voltage
12V
15V
24V

A05 - Analog 0 to +5 V Power Control
R05 - Analog 0 to +5 V Power Control – Switched
FPS - First Pulse Suppression
PPK - Pre Pulse Kill
M05 – Analog Control configured for AOM

C - Contact Cooled OEM Module

D - Digital
DN- Inverted Digital (formerly – NEG)

RF Power 2 to 24 watts range

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.

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