

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

QCXXX-YYDC-ZZZ SPECIFICATIONS

PARAMETER:	SPECIFICATION:
Output Frequency:	<u>XXX</u> = 024, 027, 041, 068, 080, or 110 as standard Where RF Frequency = 24.00, 27.12, 40.68, 68.00, 80.00, or 110.00 MHz
Frequency Stability:	± 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:	<u>ZZZ</u> = Mode
Modulation Operating Mode is "Factory Set" Internally.	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:	
Standard	TTL Levels
Inverted digital input option (NEG)	Triggered on Rising Edge 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:	<u>YY</u> 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
Weight (Driver only):	192 grams

OPERATING TEMPERATURE:

Contact Cooled

+10 to +55 °C Case Temperature, non-condensing

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°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]

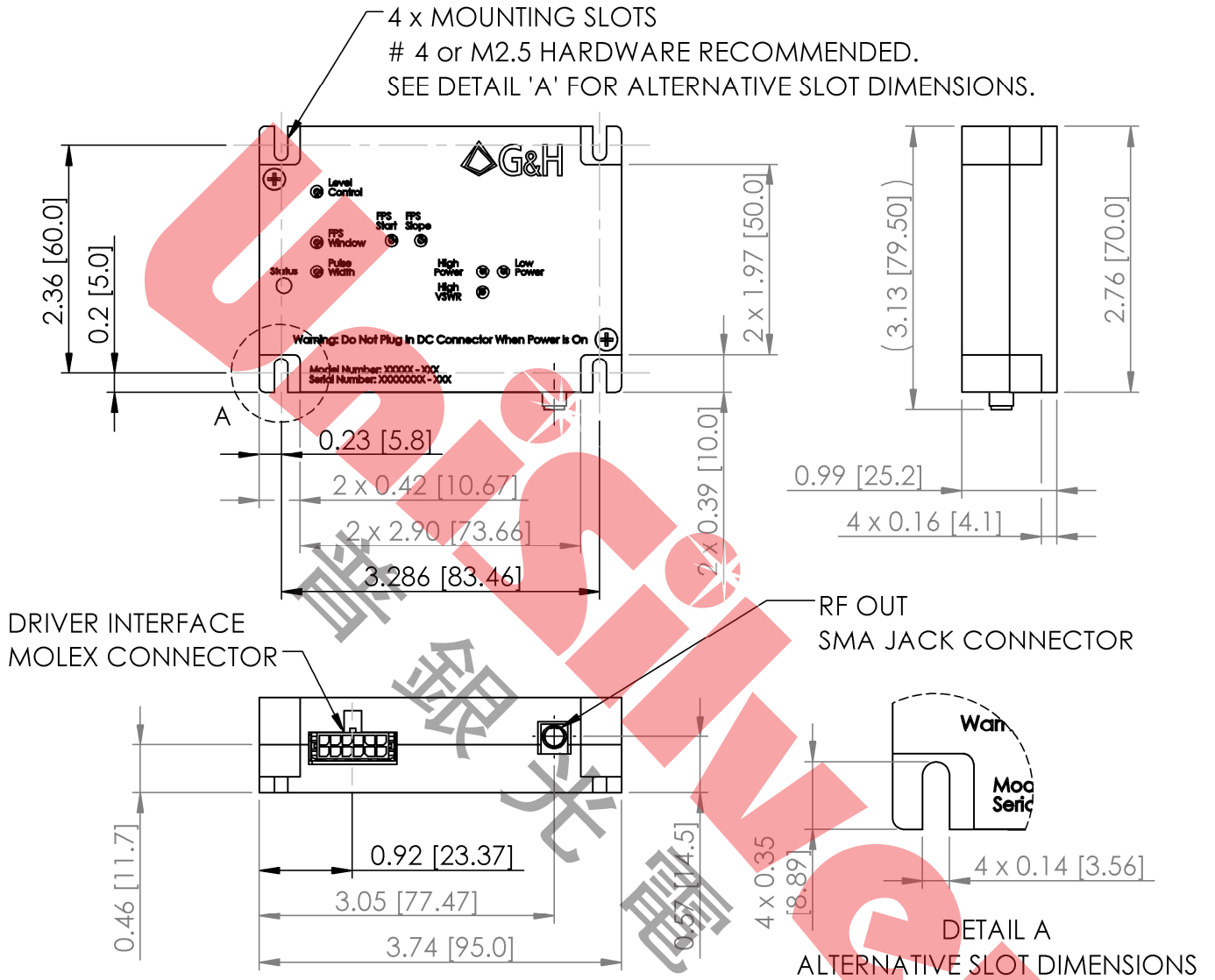
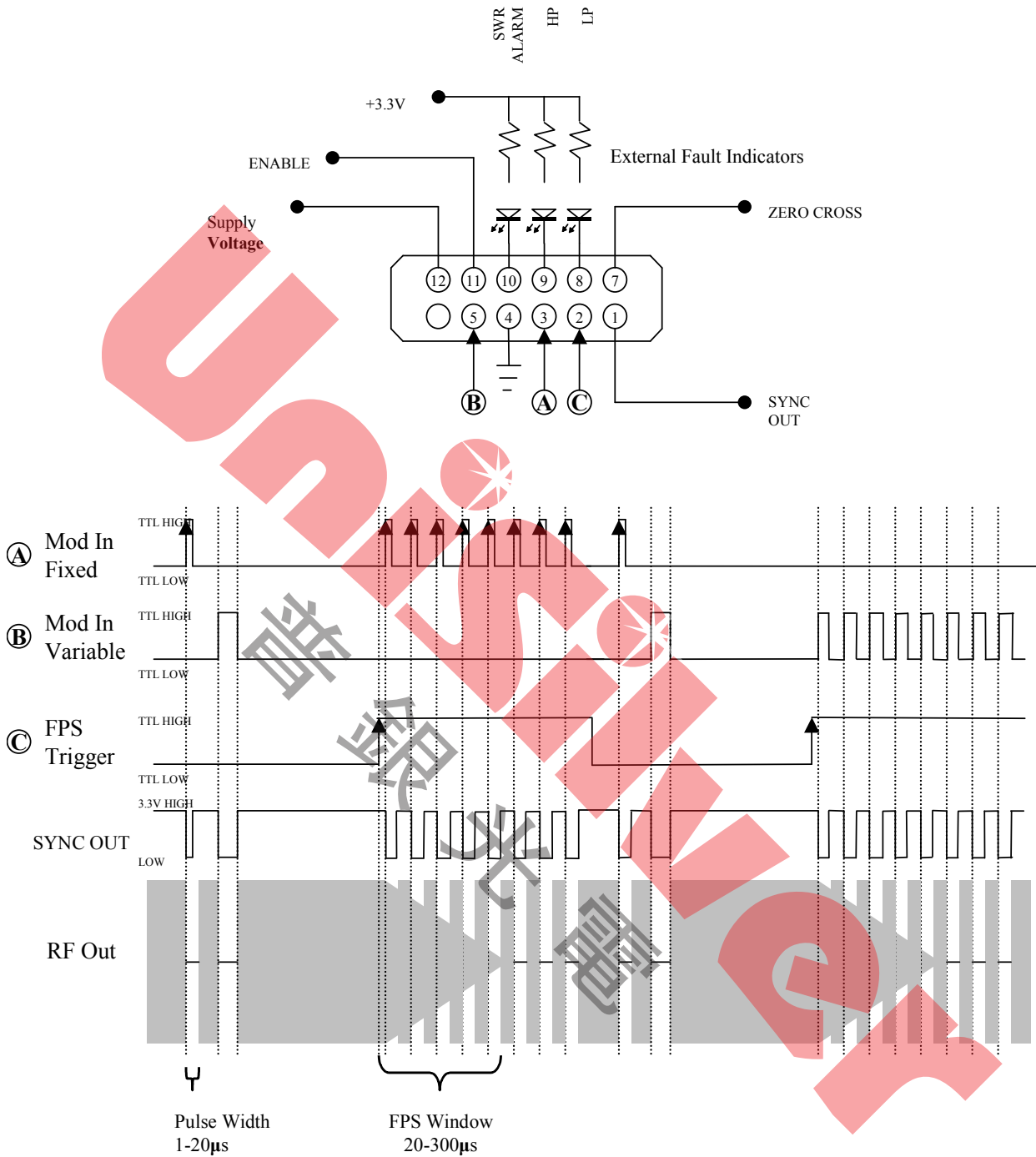
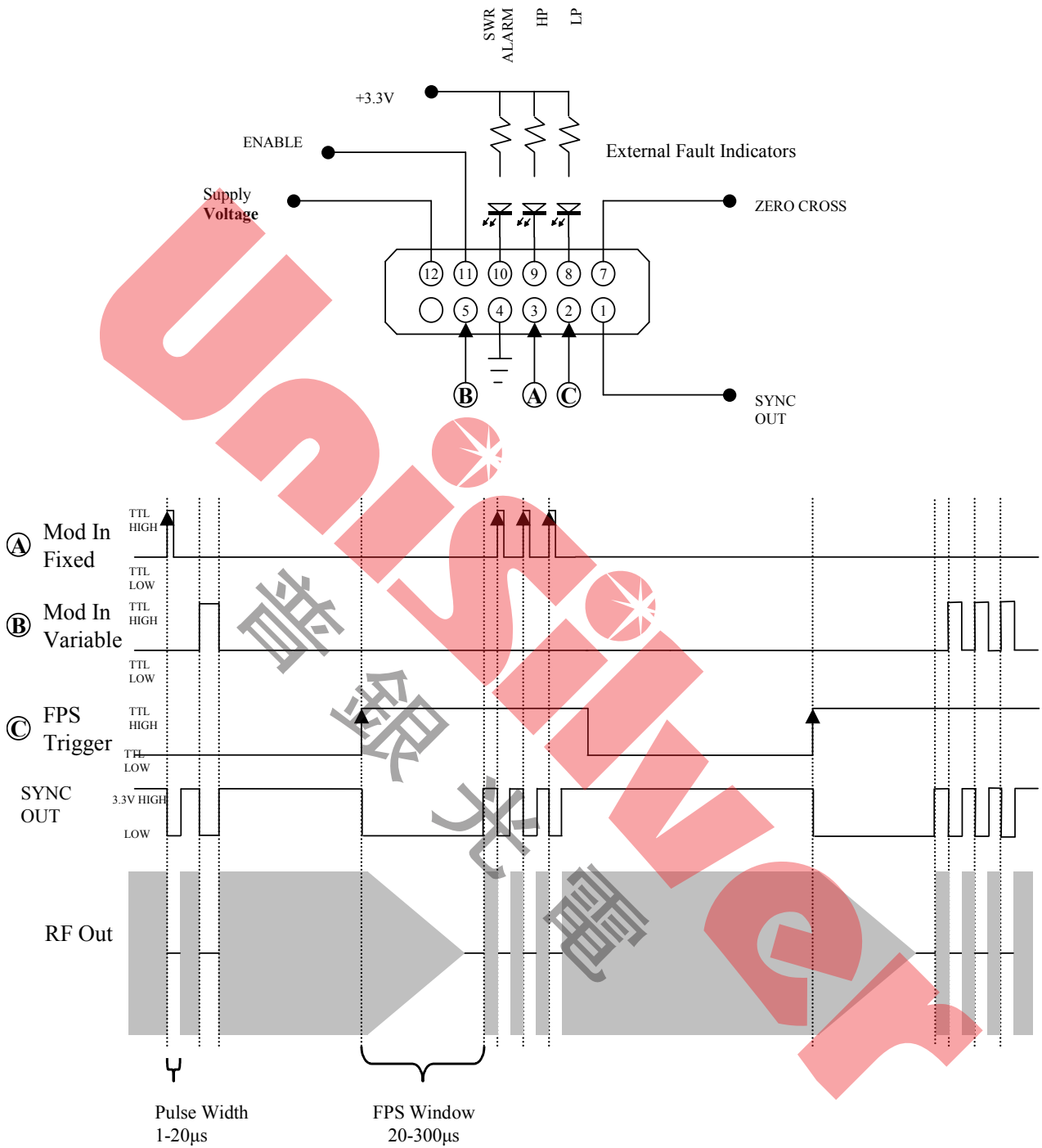


FIGURE 2
FIRST PULSE SUPPRESSION (FPS) OPERATING MODE CONTROL DIAGRAM



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

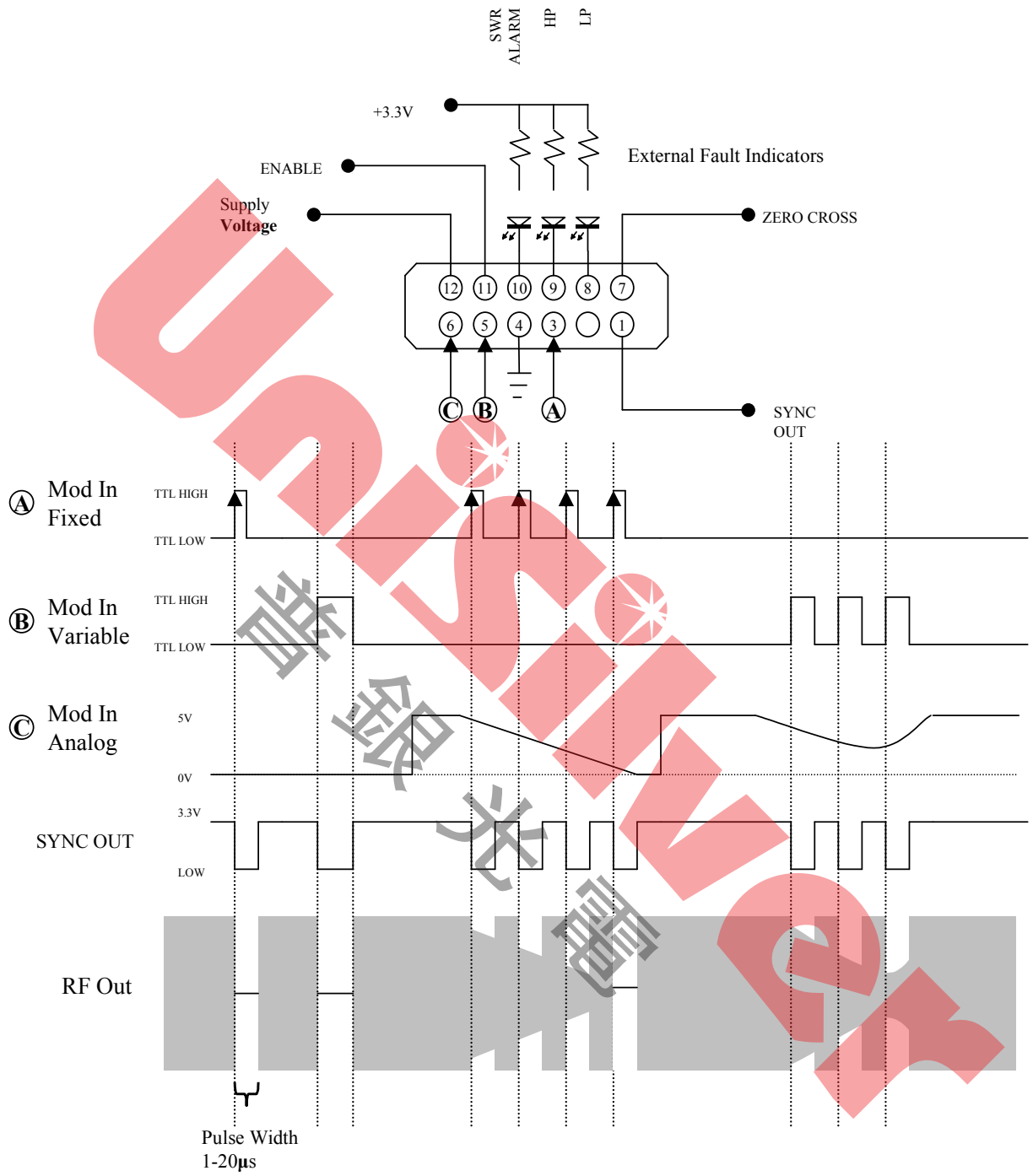
FIGURE 3
PRE PULSE KILL (PPK) OPERATING MODE CONTROL DIAGRAM



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

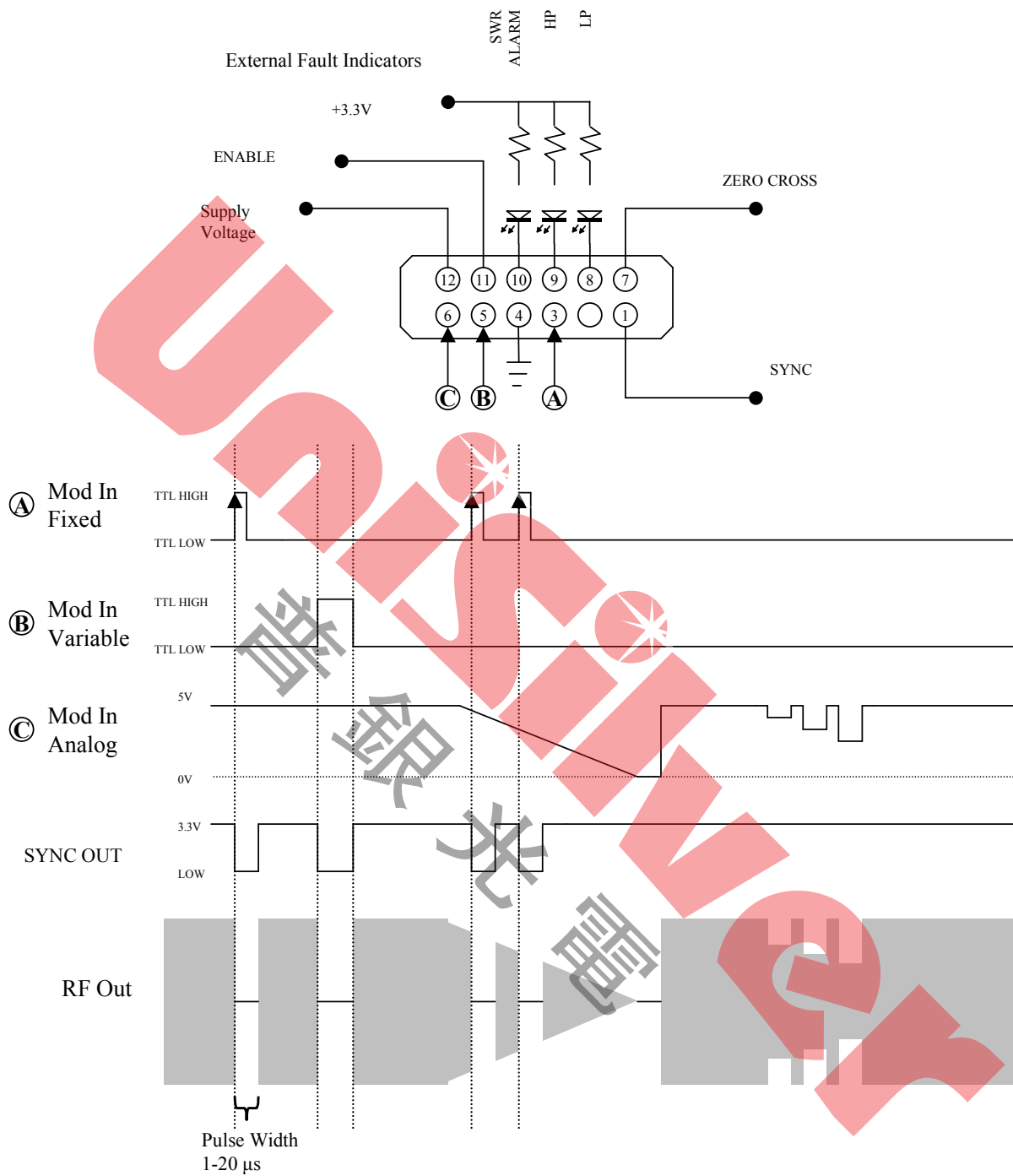
FIGURE 4

ANALOG CONTROL (R05) SWITCHED TO RF OPERATING MODE CONTROL DIAGRAM



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

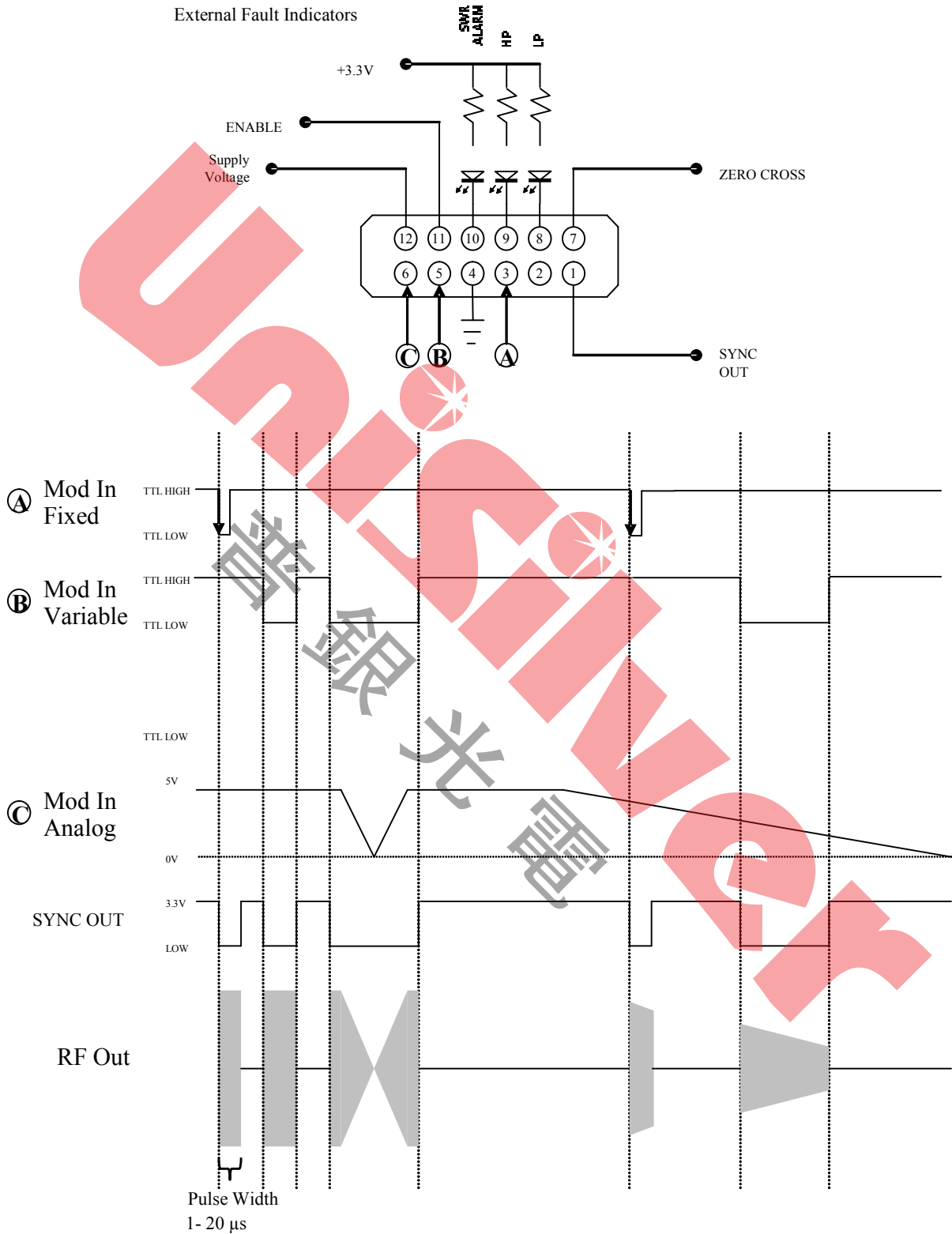
FIGURE 5
ANALOG CONTROL (A05) OPERATING MODE CONTROL DIAGRAM



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

FIGURE 6

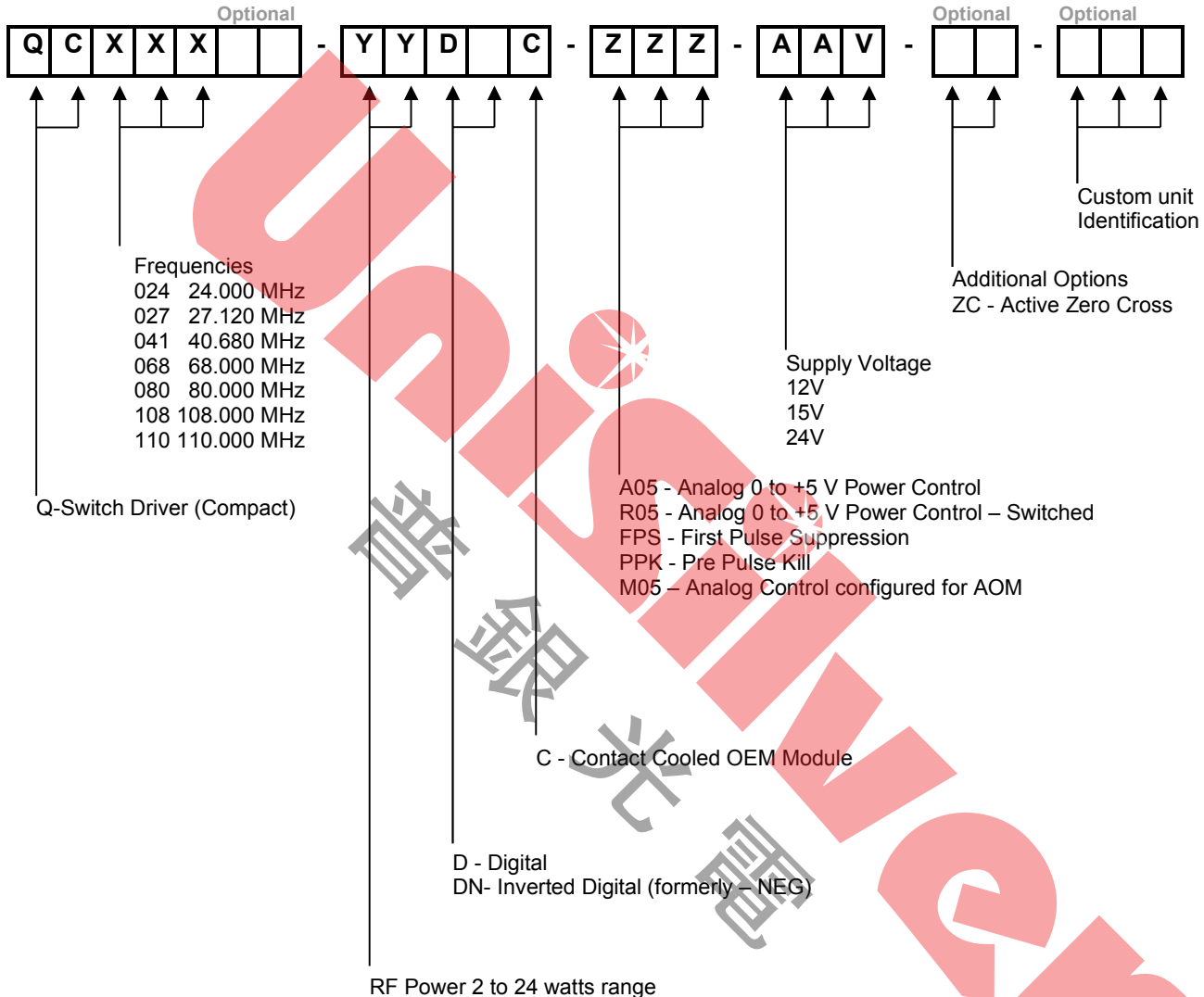
ANALOG CONTROL (M05) WITH AOM COMPATIBLE OUTPUT CONTROL DIAGRAM



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.