Agilent 6850, 6890, 7820, 7890 Series GC – APG Remote Control Specification

<table>
<thead>
<tr>
<th>Pin</th>
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<tbody>
<tr>
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<td>LOW true (input)</td>
</tr>
<tr>
<td>4</td>
<td>Shutdown</td>
<td>LOW true</td>
</tr>
<tr>
<td>5</td>
<td>Reserved</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Power on</td>
<td>HIGH true</td>
</tr>
<tr>
<td>7</td>
<td>Ready</td>
<td>HIGH true (output)</td>
</tr>
<tr>
<td>8</td>
<td>Stop</td>
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</tr>
<tr>
<td>9</td>
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**JP1, JP2**

**APG Bus**

- **Prepare**
- **Start**
- **Shutdown**
- **Reserved**
- **Ready**
- **Stop**
- **Start request**

**US2**

Transceiver

* 1.7W

+5V

- Relay

- Power on

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**Agilent Technologies**

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Agilent APG Remote Control

Remote control allows easy connection between single instruments or systems to ensure coordinated analysis with simple coupling requirements. For example, you might have an integrator, automatic sampler, and a gas chromatograph connected with Remote cables.

You can synchronize a maximum of ten instruments using Remote cables. Control of analysis is maintained by instrument readiness - READY for next analysis, followed by START of run and optional STOP of run triggered on the respective lines. In addition, PREPARE may be issued to initiate pre-run activities. All devices connected to APG remote are connected in parallel. For example, if one device is NOT READY then all devices on the buss are also NOT READY.

Note: Historically, APG stands for Analytical Products Group

APG Remote Signal Electrical Specifications

The APG signals are a modified open collector type. The signal levels are generally TTL levels (low voltage is logic zero, high voltage is logic one) but the open circuit voltage will be between 2.5 to 3.7 Volts. The typical voltage is 3 Volts. A voltage over 2.2 volts will be interpreted as a high logic state while a voltage below 0.4 volts will be interpreted as a low logic state. These levels provide some margin over the specifications of the devices used.

The pull-up resistance, connected to the open-circuit voltage, is in the range of about 1K ohms to 1.5K ohms. For a logic-low state, for a single device on the bus, the minimum current you must be able to sink is 3.3 milliamps. Since devices are connected in parallel, when you have multiple devices this minimum current must be multiplied by the number of devices attached on the bus. The maximum voltage for a low-input state = 0.4V.

The bus is passively pulled high. Leakage current out of a port must be less than 0.2 milliamps to keep the voltage from being pulled lower than 2.2 volts. Higher leakage current may cause the state to be interpreted as a low.

Over-voltage protection - APG Remote connections are clamped by a zener diode to 5.6 Volts. Exceeding this voltage will damage the circuit (main board).

APG Remote - Suggested Drive Circuits

A signal on the APG bus may be driven by another APG device or by one of the following circuits:

A relay, with one side connected to ground, when closed will set a logic-low state.

An NPN transistor, with the emitter connected to ground and the collector connected to the signal line will set a logic-low state if proper base current is supplied.

An open-collector logic gate will perform this same function.

A low-side drive IC will also work, but Darlington-type drivers should be avoided as they will not meet the low-side voltage requirement of less than 0.4V.
6890A/Plus APG Remote Connectors

Prepare (Low True) - Request to prepare for analysis. Receiver is any module performing pre-analysis activities. For example, shorting pin 2 to ground will put the GC into “Prep-Run” state. This is useful for Splitless Mode to prepare the inlet for injection or when using “Gas Saver Mode.” This function is not needed by Agilent autosampler systems.

Ready (High True) - If the Ready Line is high (> 2.2 VDC) then the system is ready for next analysis. Receiver is any sequence controller.

Start (Low True) - Request to start run/timetable. Receiver is any module performing runtime-controlled activities. The 6890 GC requires a pulse duration of at least 500 micro-seconds to sense a start from an external device.

Stop (Low True) - Request to reach system ready state as soon as possible (for example, stop run, abort or finish, and stop injection). Receiver is any module performing runtime-controlled activities. Normally this line is not connected, if the GC oven program is used to control the method “Stop” time.
**Shutdown (Low True)** - To provide maximum safety within a distributed analysis system, this line is dedicated to SHUTDOWN the system’s critical parts in case any module detects a serious problem. Receiver is any module capable to reduce safety risk.

**Power On (High True)** - To detect whether all participating modules are switched on or properly powered, this line is defined to summarize the POWER ON state of all connected modules. Receiver is any module relying on operation of others.

**Start Request (Low True)** - Request to start injection cycle (for example, by a Start key on any module). Receiver is the automatic liquid sampler.

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**6890A/Plus APG Timing Diagram**

![Timing Diagram](chart.png)
### 6850, 6890N, 7820, 7890 APG Remote Connector

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#### 6850, 6890N, 7820, 7890 APG Remote Signal Descriptions

**Prepare (Low True)** - Request to prepare for analysis. Receiver is any module performing pre-analysis activities. For example, shorting pin 2 to ground will put the GC into “Prep-Run” state. This is useful for Splitless Mode to prepare the inlet for injection or when using “Gas Saver Mode.” This function is not needed by Agilent autosampler systems.

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**Start (Low True)** - Request to start run/timetable. Receiver is any module performing runtime-controlled activities. The 6890 GC requires a pulse duration of at least 500 micro-seconds to sense a start from an external device.

**Start Relay (Contact Closure)** - A 120 millisecond contact closure – used as an isolated output to start another device that is not compatible or connected with APG Remote pin 3.

**Stop (Low True)** - Request to reach system ready state as soon as possible (for example, stop run, abort or finish, and stop injection). Receiver is any module performing runtime-controlled activities. Normally this line is not connected, if the GC oven program is used to control the method “Stop” time.
6850, 6890N, 7820, 7890 APG Remote Timing Diagram