

# Digital Order Wire

## Supporting and Capabilities



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### Switch to the Future—a Flexible Future

The Raven 61610 Digital Orderwire allows voice communications through a 64 Kbps digital service between different locations without using revenue-generating bandwidth. This is done by including voice codecs in the Orderwire Terminal. The 61684 Digital Bridge module provides four 64 Kbps RS-422 (V.11) ports for connection to the service channel equipment, as well as two analog VF ports, or one VF port and one or two RS-232 data ports, and the drop to the Order Wire front panel. The Digital Bridge performs the conference bridge function for all these signal paths eliminating additional quantizing units at repeater and hub sites.



**RS-422 Ports** utilize an 8-wire interface, with balanced pairs for TX Data, RX Data, TX Clock, and RX Clock. Two relays are included to loop the Port 1 RX Data to the Port 2 TX Data and the Port 2 RX Data to Port 1 TX Data when the Order Wire is powered off. This feature allows the service channel on the main route (connected to Ports 1 and 2) to main functional even if the Order Wire at a particular site is powered off or fails.

### Benefits

- Selective Dialing which increases network diagnostics abilities
- Digital and analog conversion occurs at voice terminal thus eliminating noise
- Programmable quickly via a hand held programmer or personal computer
- Independent panel speaker and handset volume control
- Alert tones can be programmed depending on the requirements

**The Front Panel** includes a handset with cradle and hookswitch, headset jacks, a one watt speaker with volume control, a DTMF keypad, and LED indicators for power, off hook, and incoming call. The voice codec and speaker amplifier are located inside the front panel on the 616-110 Front Motherboard. The Up and Down Volume buttons control the volume digitally through the micro-controller on the Digital Bridge such that the speaker (on hook) and handset/headset (off hook) volume are set independently.

An Expansion bus interconnects the front panel and Digital Bridge to route control signals and digitized audio between the various circuits.

**The 61684 Digital Bridge** includes DSP circuitry, a micro-controller, and associated memory and buffers. Ringback and call alert tone generation, DTMF encoding and decoding, and volume control are performed digitally by the DSP circuitry, microcontroller, and other digital processing circuitry.

The DTMF station call code, All Call code, ring period, call alert tone volume and frequency, and the setup of the various ports are stored in non-volatile RAM, also located on this module.

**A Digital Phase Locked Loop (PLL)** circuit on the 61684 Digital Bridge synchronizes the Order Wire to the external clock source. This eliminates slip and skip problems since all internal clocks and counters are locked to the external clock source. The PLL locks to the clock on Bridge Port 1 as the default. If a valid clock is not found, or is lost, on Port 1, the PLL will “hunt” through Ports 2, 3, 4, and back to 1 until valid clock is found. If no external clock is found, the PLL locks to an internal clock to run the internal circuitry, but nothing will be transmitted on the four RS-422 ports.

### System Description

**The 61684 Digital Bridge** splits the 64Kbps paths.

\* The Order Wire voice and Voice Frequency (VF) Port 1 are digitized into a 14-bit format and then compressed to a 4-bit ADPCM signal. This 4-bit signal is inserted into the upper nibble of the 8-bit word. If the second 32Kbps path is used as an auxiliary VF path, it is likewise compressed and inserted into the lower nibble of the 8-bit word. If the second 32Kbps path is used for serial data, it is inserted into the lower nibble with no compression.

\* If the second 32Kbps path is used as an auxiliary talk path or for VF data, it is assigned to VF Port 2. Thus, VF Port 1 is assigned to the Order Wire talk path for an analog extension, and VF Port 2 is assigned to the auxiliary path. These VF paths operate as two independent voice circuits.

\* If the second 32Kbps path is used to transport digital data, it can be assigned to one or both of the RS-232 data ports. If both RS-232 ports are utilized, the maximum data rate is 9.6Kbps. If

only one of the RS-232 ports is utilized, the maximum data rate is 19.2Kbps.

\* VF Port 2 and the RS-232 Data are mutually exclusive. If the auxiliary path is provisioned to carry serial data, VF Port 2 is disabled. VF Port 1 is always associated with the Order Wire talk path and is not affected by the data selection. The Bridge can be re-provisioned with an ASCII terminal device to change the configuration of the VF and data ports.

**The 61620-01 Power Supply** provides a regulated +5VDC and  $\pm 12$ VDC to power the Orderwire from a -24 to -56VDC source. Option -02 is utilized if the power source is 110/220VAC. The Power Supply includes a “power good” circuit, which activates an alarm if any of the three voltages go out of regulation. The watchdog on the Digital Bridge also activates the circuit for a micro-controller failure. This alarm is available on the rear panel terminals as a dry contact closure (POWER/CPU ALARM). The Power LED on the front panel also Goes off if any of the voltages fail.

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## Specifications

### Power Requirement

- Input Power: -24 to -56VDC or 110/220VAC
- Current Drain: 800mA @ -24VDC or 200mA @ 110VAC maximum

### RS-422 (V.11) Ports

#### Input Voltage

- Differential Threshold:  $\pm .2$ VDC
- Common Mode:  $\pm 7$ VDC maximum

#### Output Voltage

- Differential Output:  $\pm 5$ VDC (no load)  
 $\pm 12$ VDC (100  $\Omega$  load)
- Short Circuit Current: 150mA maximum
- Maximum Load: 100  $\Omega$
- Data Rate: 64Kbps synchronous

### Analog Ports

- Levels: +7 to -16dBm @ 600  $\Omega$  adjustable in .1 dB increments
- Frequency Response: 300 to 3400Hz  $\pm .5$ dBm ref. to 1KHz
- Isolation: >60dB
- Idle Noise: <25dbrnC0

### RS-232 (V.28) Data Port

- Baud Rate: .3 to 9.6Kbps with two data ports up to 19.2Kbps with one data port
- Input Voltage: +12VDC
- Turn-On Threshold: 1.8V typ.
- Turn-Off Threshold: 1.0V typ.
- Output Voltage: +9V minimum
- Short Circuit Current: 25mA maximum



### DTMF Signaling

- Addressable site codes: site code., plus "all call" and "group call"
- Number of digits in code: one to five
- Ring time: 10 to 120 seconds, programmable in one second increments
- Inter-digit Time-Out: 5 seconds
- Minimum Tone Duration: 40mSec.
- Minimum Inter-digit Pause: 40mSec.

### Environmental

- Operating temperature: 0 to 50 Celsius
- Storage temperature: -40 to +80 Celsius
- Relative Humidity: 0% to 95% non-condensing
- Maximum Operating Altitude: 15,000 feet (4572 meters)

### Physical Characteristics

- Height: 7" (8.9 cm)
- Width: 17.25" (43.8 cm)
- Depth: 13.1" (33.3 cm)
- Weight: 20 lbs. (9.1 kg)
- Mounting: 19" or 23" rack

The front panel includes a handset with a cradle and hookswitch, headset jacks, a one watt speaker with volume control, a DTMF keypad, and LED indicators for power, off hook, and incoming call. The voice codec and speaker amplifier are located inside the front panel on the 616-110 Front Motherboard. The Up and Down Volume buttons control the volume digitally through the micro-controller on the Digital Bridge such that the speaker (on hook) and handset/headset (off hook) volume are set independently. An Expansion bus interconnects the front panel and Digital Bridge to route control signals and digitized audio between the various circuits.



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## About Raven Electronics Corporation



Raven Electronics Corporation is currently enjoying more than a quarter century of success in the telecommunications industry. An Original Equipment Manufacturer of voice and data switching equipment, Raven serves a variety of domestic and international customers including telephone and utility companies, government agencies, the military, satellite communications companies, and OEMs. We are committed to providing our customers with high performance, high quality, competitively-priced equipment that keeps pace with changing industry requirements.



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