

ES820
Secure Wireless Bridge
Hardware Guide

Fortress ES820 Secure Wireless Bridge ES820 [rev. 1]

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THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS B DIGITAL DEVICE, PURSUANT TO PART 15 OF THE FCC RULES. THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST HARMFUL INTERFERENCE IN A RESIDENTIAL INSTALLATION. THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND, IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTIONS, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS. HOWEVER, THERE IS NO GUARANTEE THAT INTERFERENCE WILL NOT OCCUR IN A PARTICULAR INSTALLATION. IF THIS EQUIPMENT DOES CAUSE HARMFUL INTERFERENCE TO RADIO OR TELEVISION RECEPTION, WHICH CAN BE DETERMINED BY TURNING THE EQUIPMENT OFF AND ON, THE USER IS ENCOURAGED TO TRY TO CORRECT THE INTERFERENCE BY ONE OR MORE OF THE FOLLOWING MEASURES:

- REORIENT OR RELOCATE THE RECEIVING ANTENNA.
- INCREASE THE SEPARATION BETWEEN THE EQUIPMENT AND THE RECEIVER.
- CONNECT THE EQUIPMENT INTO AN OUTLET ON A CIRCUIT DIFFERENT FROM THAT TO WHICH THE RECEIVER IS CONNECTED.
- CONSULT THE DEALER OR AN EXPERIENCED RADIO/TV TECHNICIAN FOR HELP.

YOU MAY ALSO FIND HELPFUL THE FOLLOWING BOOKLET, PREPARED BY THE FCC: "HOW TO IDENTIFY AND RESOLVE RADIOTV INTERFERENCE PROBLEMS." THIS BOOKLET IS AVAILABLE FROM THE U.S. GOVERNMENT PRINTING OFFICE, WASHINGTON, D.C. 20402

CHANGES AND MODIFICATIONS NOT EXPRESSLY APPROVED BY THE MANUFACTURER OR REGISTRANT OF THIS EQUIPMENT CAN VOID YOUR AUTHORITY TO OPERATE THIS EQUIPMENT UNDER FEDERAL COMMUNICATIONS COMMISSION RULES. IN ORDER TO MAINTAIN COMPLIANCE WITH FCC REGULATIONS, SHIELDED CABLES MUST BE USED WITH THIS EQUIPMENT. OPERATION WITH NON-APPROVED EQUIPMENT OR UNSHIELDED CABLES IS LIKELY TO RESULT IN INTERFERENCE TO RADIO AND TELEVISION RECEPTION.

THIS DEVICE HAS BEEN DESIGNED TO OPERATE WITH THE ANTENNAS HAVING A MAXIMUM GAIN OF 9 DB. ANTENNAS HAVING A GAIN GREATER THAN 9 DB ARE STRICTLY PROHIBITED FOR USE WITH THIS DEVICE. THE REQUIRED ANTENNA IMPEDANCE IS 50 OHMS.

OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS: (1) THIS DEVICE MAY NOT CAUSE INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRE OPERATION OF THE DEVICE.

TO REDUCE POTENTIAL RADIO INTERFERENCE TO OTHER USERS, THE ANTENNA TYPE AND ITS GAIN SHOULD BE SO CHOSEN THAT THE EQUIVALENT ISOTROPICALLY RADIATED POWER (E.I.R.P.) IS NOT MORE THAN THAT PERMITTED FOR SUCCESSFUL COMMUNICATION.

ICES-003 STATEMENT:

THIS CLASS B DIGITAL APPARATUS COMPLIES WITH CANADIAN ICES-003.

CET APPAREIL NUMÉRIQUE DE LA CLASSE B EST CONFORME À LA NORME NMB-003 DU CANADA.

ANTENNA RESTRICTIONS

THIS DEVICE HAS BEEN DESIGNED TO HAVE A MAXIMUM GAIN OF 9 DBI. ANTENNAS HAVING A GAIN GREATER THAN 9 DBI ARE STRICTLY PROHIBITED FOR USE WITH THIS DEVICE. THE REQUIRED ANTENNA IMPEDANCE IS 50 OHMS. THIS PRODUCT IS NOT CAPABLE OF OPERATING IN THE 5600MHZ – 5650MHZ RANGE. THIS PRODUCT MUST BE OPERATED NO CLOSER THAN 20CM TO THE HUMAN BODY.

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1 Port Locations

The ES820 Bridge's power inlet, input/output control connector, and antenna ports are located on the back panel, shown below.

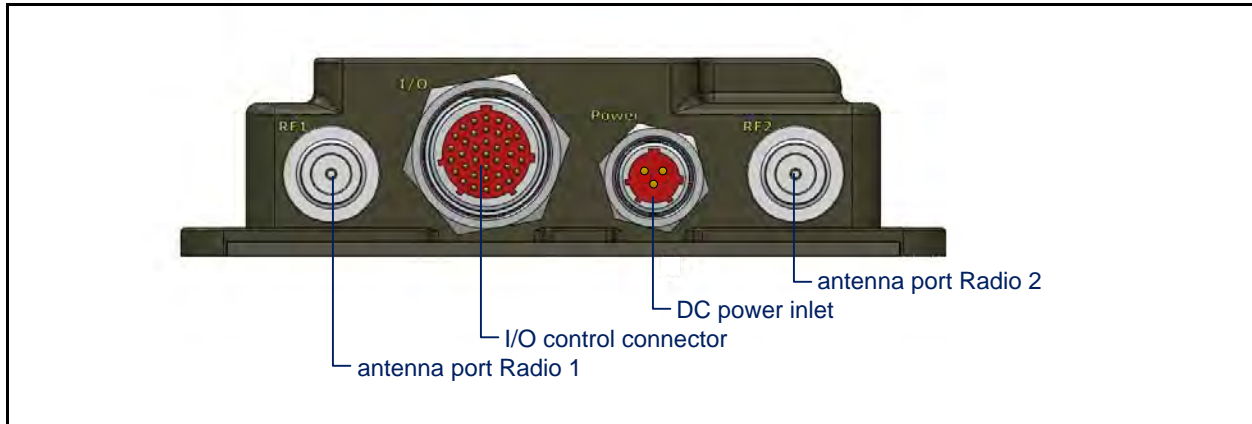


Figure 1 ES820 Back-Panel Port Locations

2 LED Indicators

The ES820 Bridge's front panel features six system LEDs.

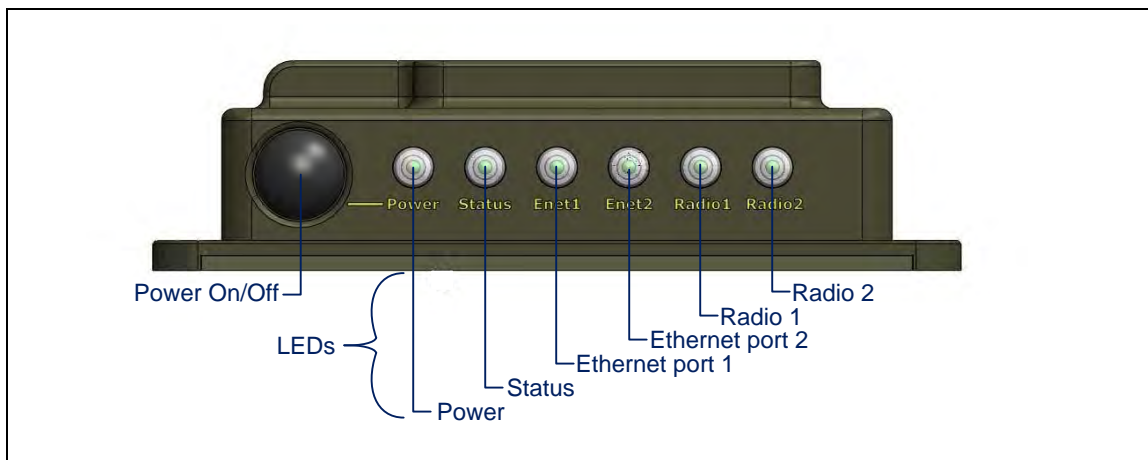


Figure 2 ES820 Front-Panel Power Control and LEDs

Power *can exhibit:*

- ◆ *solid green* - Bridge is powered on and operating normally.
- ◆ *off* - Bridge is powered off.
- ◆ *slow-flash green* - Bridge is booting.

Status *can exhibit:*

- ◆ *intermittent green* - Cleartext is passing on an encrypted port.

Ethernet1 *and* Ethernet2 *can exhibit:*

- ◆ *solid green* - Link has been established.
- ◆ *intermittent green* - Traffic is passing on the port.

Radio1 and Radio2 can exhibit:

- ◆ *solid green* - Radio is on.
- ◆ *intermittent green* - Radio is passing traffic.
- ◆ *off* - Radio is off or Bridge's *RF Kill* function is enabled.

color	behavior	Power	Status	Enet1/Enet2	Radio1/Radio2
green	<i>solid</i>	normal operation	-	link established	radio ON
	<i>slow flash</i>	booting	-	-	-
	<i>fast flash</i>	-	-	-	-
	<i>intermittent</i>	-	cleartext on encrypted port	passing traffic	passing traffic
<i>off</i>		powered OFF	-	-	radio OFF or RF Kill enabled

3 Chassis and I/O Controls

The single front-panel button powers the ES820 Bridge ON and OFF.

- ◆ If the Bridge is off, press the **Power** button to turn it on.
The **Power** LED will slow-flash green while the Bridge boots, then light solid green for normal operation.

or

- ◆ If the Bridge is on, press the **Power** button to turn it off.
The **Power** LED will go dark.

Reboot (hard boot) the ES820 by powering it off and back on again (described above).

The power button is tied to pin 33 or the Bridge's 37-pin I/O connector, which is a power control line. Both switches must be OFF to power the ES820 off.

There are four control lines in addition to **Power**, described in Section 4, below.

4 Radios

The ES820 Bridge contains two radios:

Radio 1 - 802.11a/b/g/n radio

Radio 2 - high power 802.11a/n radio

The antenna ports on the ES820 back panel correspond to these radio numbers as shown in Figure 1.

The last two LEDs on the right of the ES820 front panel correspond to the radios as shown in Figure 2.

5 37-Pin Input/Output Connector

The connector on the rear panel of the ES820 provides all non-radio input/output for the unit. In order to connect to the ES820, a cable with a matching connector must be made, using the required to connector type:

Amphenol MILDTL-D38999 / 26MD35PN

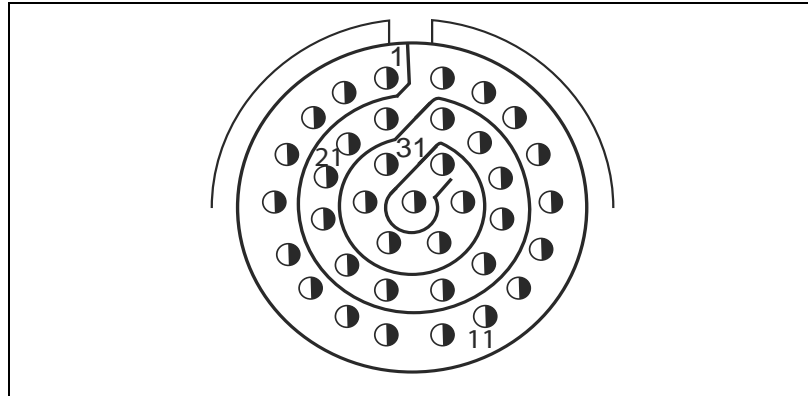


Figure 3. MIL-DTL-38999 Series III TV Shell/Insert 15-35 (socket)

Table 1 defines the pin-out required for the ES820 cable connector. Most definitions are standard (ex., Ethernet, serial, and USB). Five pins are unique to the ES820:

- ◆ **Power** (pin 33 - active lo) - powers the ES820 on and off. When this pin is toggled lo, the unit is permitted to power up and boot. The switch state is tied to the chassis ON/OFF switch: both switches must be OFF to turn the unit off. Tie this pin to a toggle switch.
- ◆ **Blackout** (pin 24 - active lo) - controls blackout mode, which turns all chassis LEDs OFF. When this pin is held lo, all of the LEDs on the box are dark at all times. When the pin is not held lo, LEDs revert to normal operation. This pin would commonly be tied to a toggle switch.
- ◆ **RF Kill** (pin 22 - active lo) - controls the RF Kill feature, which turns all radio transmission OFF. When this pin is held lo, all RF emissions are suppressed. When the pin is not held lo, radios revert to normal operation, as defined by the current configuration of the ES820. This pin would commonly be tied to a toggle switch.
- ◆ **Reset** (pin 23 - active on falling edge) - reboots the box. Resetting is equivalent to power cycling the ES820. The reset function is immediate: all current operations are stopped and the ES820 restarts from the initial power-on state. This pin would commonly be tied to a push button.
- ◆ **Zeroize** (pin 32 - active on rising edge) - restores the configuration to factory defaults. This pin activates on the rising edge of the signal. The zeroize function is immediate when the ES820 is powered on. If the ES820 is powered off

when the zeroize is pressed, the function is executed as soon as power is applied. This pin would commonly be tied to a push button.

The 37-pin connector provides support for six LEDs, five controls, two Ethernet ports, one USB port, and one RS232 COM port.

Table 1. ES820 37-Pin I/O Connector Pin-Outs

pin	signal	dir	description
1	GND	-	USB pin 4 Ground
2	USB D+	Bi	USB Data+ pin3, twisted pair+
3	USB D-	Bi	USB Data- pin2, twisted pair-
4	USB Vcc	-	USB pin1 Vcc (5V), up to 200mA
5	Enet2 Link/Act LED	Out	LED2-, active Lo (8mA @2V diode)
6	Radio2 LED	Out	LED3-, active Lo (8mA @2V diode)
7	Radio1 LED	Out	LED4-, active Lo (8mA @2V diode)
8	Status LED	Out	LED5- active Lo (8mA @2V diode)
9	Power LED	Out	LED6- active Lo (8mA @2V diode)
10	LED Power	-	3.3V through 10 ohms, 48 mA max, 330mA shorted; Connect to the six LED+ pins
11	Enet2 D-	-	Enet 2- RJ45 pin 7 Cat5 twisted pair4
12	Enet2 RX-	In	Enet 2- RJ45 pin 6 Cat5 twisted pair2
13	Enet2 TX+	Out	Enet 2- RJ45 pin 1 Cat5 twisted pair1
14	Enet2 TX-	Out	Enet 2- RJ45 pin 2 Cat5 twisted pair1
15	Enet1 D-	-	Enet 1- RJ45 pin 7 Cat5 twisted pair4
16	Enet1 RX-	In	Enet 1- RJ45 pin 6 Cat5 twisted pair2
17	Enet1 RX+	In	Enet 1- RJ45 pin 3 Cat5 twisted pair2
18	Enet1 TX-	Out	Enet 1- RJ45 pin 2 Cat5 twisted pair1
19	GND	-	COM, RS232 Ground (Monitor Port)
20	COM TXD	Out	COM, RS232 Xmt (Monitor Port)
21	Enet1 Link/Act LED	Out	LED1- , active Lo (8mA @2V diode)
22	RF Kill_n (Toggle)	In	SW1, RFKILL, active Lo
23	Reset_n (PB)	In	SW3, Reset, active on falling edge
24	Blackout_n (Toggle)	In	SW5, Blackout, active Lo
25	Enet2 D+	-	Enet 2- RJ45 pin 8 Cat5 twisted pair4
26	Enet2 RX+	In	Enet 2- RJ45 pin 3 Cat5 twisted pair2
27	Enet2 C+	-	Enet 2- RJ45 pin 4 Cat5 twisted pair3
28	Enet1 D+	-	Enet 1- RJ45 pin 8 Cat5 twisted pair4
29	Enet1 C-	-	Enet 1- RJ45 pin 5 Cat5 twisted pair3
30	Enet1 TX+	Out	Enet 1- RJ45 pin 1 Cat5 twisted pair1
31	COM RXD	In	COM, RS232 Rcv (Monitor Port)
32	Zeroize (PB)	In	SW2, Zeroize, active on rising edge
33	Power_n (Toggle)	In	SW4, Power on, active Lo
34	Enet2 C-	-	Enet 2- RJ45 pin 5 Cat5 twisted pair3
35	GND	-	Ground
36	Enet1 C+	-	Enet 1- RJ45 pin 4 Cat5 twisted pair3
37	GND	-	Ground

6 3-Pin DC Input Connector

The Bridge uses a 3-pin connector to input power.

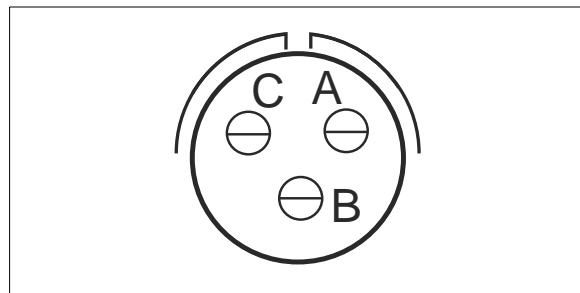


Figure 4 3-pin Power Connector Pins

Table 2 shows the power connector pin-outs.

Table 2. ES820 DC Power Connector Pin-Outs

pin	signal
A	+9 to 30 VDC
B	N/C
C	GND

7 Dimensions and Weight

dimension	inches	centimeters
height	1.75	4.44
width	6.85	17.4
depth	7.29	18.52

The ES820 weighs 2 lbs 8 oz (1.13 kg).