

GS8

Modular gateway



Key Features

- Modular gateway supporting analog, CDMA, and GSM
- 2G, 2.5G, and 3G compatible
- Permits mixture of interfaces
- Connects to VoIP PBXs and SIP networks with Ethernet
- Operates as a gateway (with clustering) without IP PBX
- Connects to PBXs, key telephone systems, analog phones, or analog phone lines
- Up to four GSM or CDMA interfaces
- Use a single external antenna with RF splitter
- Up to eight analog FXO interfaces
- Up to four analog FXS interfaces
- Up to eight channels of voice
- Send and receive voice calls between any interfaces
- Passes caller ID for incoming calls
- Send and receive SMS and MMS
- Captures log of calls and statistics
- Simple configuration with web browser
- Multiple languages and worldwide support

Benefits

- Connects directly to IP or analog PBX to simplify wiring
- Connects to traditional phone systems with analog circuits
- Compatible with open standards SIP networks
- Connect to wireless and land line phone networks
- Free calls to phone network (depending on plan)
- Easy expansion of phone lines
- Extend PBX extension seamlessly to your mobile phone
- Setup an office without needing land lines
- Mobile phones become extensions of business PBX
- Useful for businesses from SOHO to branch office to enterprise

Description

The Zed-3 GS8 modular gateway is a stand alone gateway for VoIP, PSTN, and mobile phone networks. It converts the format of a phone call to allow it to pass among these networks. The device connects to the PSTN using analog, the mobile network using GSM or CDMA, and the IP network using SIP.

With this device you obtain great flexibility in how calls should be routed and have a means to provide telephony backup in the event the standard telephony path fails. Further, you can significantly reduce the money you spend on telephony, especially for the cost of calls from your internal phone system to CDMA or GSM phones.

The GS8 modular gateway is compatible with most IP PBXs using the SIP protocol, is compatible with traditional (legacy) phone systems with analog circuits, and can be used separately or in a cluster without any PBX. It provides a means to easily integrate mobile telephony as part of your company's phone system.



Hardware and Telephony

The GS8 modular gateway can be mounted in a 19" rack and has four slots into which you can plug any interface module. The GSM, CDMA, and FXS modules have one port (or circuit) each; the FXO module has two ports (circuits).

The FXS port can connect to analog telephones or to a PBX (in which case, it appears as the telephone exchange). The FXO port connects as a subscriber to your PBX or to the telephone exchange.

If you have a single wireless module, you may be able to connect a small antenna directly to the module. However, for better reception, you may want to use an external antenna, connected with coaxial cable to the module. If you have multiple modules, you should use the antenna splitter (combiner) and then use a single external antenna.

SIP Operation

There are two working modes in which the GS8 modular gateway connects with other SIP devices, including interconnection with other GS8 modular gateways.

The basic working mode is similar to that of a SIP phone in which the GS8 modular gateway registers to another SIP device, such as a soft switch or IP PBX.

The second working mode is to connect to other SIP devices without registration. This permits the GS8 modular gateway to operate independently of an IP PBX and also permits the clustering of GS8 modular gateways to transparently create a virtual gateway that has more than four wireless ports.

SMS and MMS

The GSM and CDMA modules can send and receive SMS text messages and MMS multimedia messages to or from a mobile phone. These are transmitted over the Ethernet port as SIP MESSAGE messages to ensure compatibility with a variety of different SIP PBXs. You determine for each module the destination of received SMS or MMS messages and you can program that SMS and MMS messages are always sent to a person who sent an SMS or MMS to that phone number within a specified time.

The GS8 modular gateway can send and receive text messages in 7 bit mode (160 characters per message) or in Unicode (70 characters per message). It can send and receive multimedia messages comprising images and rich text that are limited to 30 KB. The sending or receiving client is responsible for formatting or interpreting the message to OMA specifications.

IVR (Interactive Voice Response)

The GS8 modular gateway has an IVR function that can prompt callers. This can be enabled or disabled separately for the IP, FXO, GSM, and CDMA ports.

When enabled, it provides authentication and two stage dialling. A call is answered by the GS8 modular gateway which then prompts the caller to enter a password, a number, or both, depending on your criteria. When calls are received on the specific interface, the GS8 modular gateway will verify the password (if programmed), and collect the destination phone number. The call is then routed according to the routing table in the same way it would be if the IVR was not enabled on that port.

System Administration

The GS8 modular gateway has an HTML based administration UI so that it is not necessary to install any management software on a PC. The administration UI is intuitive and easy to navigate. You can access and manage the GS8 modular gateway from anywhere as long as you have a web browser and access to the Internet.

The administration UI provides various real time information and statistics of the GS8 modular gateway. These include operation state, system and network information, events and alarms, line status, and comprehensive call detail records (CDRs).

Data Networking

Most IP networks existing today support VLAN and QoS and using these features can increase the voice quality of phone calls. The GS8 modular gateway fully supports IEEE 802.1Q VLAN tagging and IEEE 802.1p QoS. At the IP layer, the GS8 modular gateway supports the ability to mark the lower six bits of the IP QoS byte with the various differentiated service code point (DSCP) markings.

Diagnostics and SNMP

The system chassis has two LEDs on the front to indicate the status and two LEDs on the Ethernet port. The wireless modules have two LEDs to indicate status and the analog modules have a single LED per port to indicate when a call is in progress.

The system provides ping, traceroute, and DNS lookup for network diagnostics. These tools will help you identify most networking problems. To identify call setup problems, the system also provides a SIP Route Trace diagnostic tool.

The GS8 modular gateway supports Trap in SNMP. This allows you to be notified immediately if the system is experiencing any problems.

Global Features

Zed-3 sells and supports its products worldwide. The GS8 modular gateway supports telephony protocols for many countries so it can connect directly to the local PSTN. Different modules are available for the GSM frequencies of 850 MHz and 1900 MHz (USA and most of the Americas) or 900 MHz and 1800 MHz (most of the rest of the world). The CDMA module operates at 800 MHz, serving most

parts of the world. You can navigate the GS8 modular gateway's administration UI in English or Simplified Chinese.

Application: Basic Use

Equipped with GSM and CDMA modules, the GS8 can connect your office phone system directly to the mobile phone network. Depending on the calling plan you have with your carrier, this could mean that calls to the PSTN or other mobile phones cost nothing for each call.

The configuration shown in the figure on the back page permits the office to make and receive calls over the mobile network instead of over the PSTN land line.

Some carriers offer free calls among a group of users. By putting one of the SIM cards in the GS8, calls between your remote users and the office will be free. Similarly, some mobile phone carriers have very low cost rates for international calls compared to an equivalent call on a land line. By routing all international traffic over the GSM or CDMA network, your company may have significant savings.

The business can also choose to publish the mobile phone number associated with the ports on the GS8 modular gateway. Callers using a mobile phone may be able to call the company's "mobile" number cheaper than if they called the company's land line phone number. This will lead to increased business and customer satisfaction.

Application: One Number for Executives

As an extension of the previous application, you can use call forwarding on the PBX to automatically route inbound calls to your mobile phone. Depending on the PBX, you may be able to do this selectively, based on the time of day, day of week, or caller.

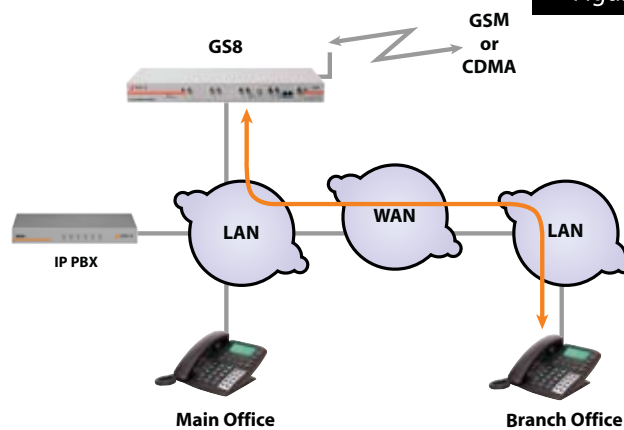
Then when the executive is not in the office he or she can still receive calls directed to the office phone. This is achieved without having to disclose the executive's mobile phone number to the caller. The call is forwarded to the mobile phone automatically, with minimal delay, and at no additional cost to the caller or the business (depending on the calling plan).

Application: Extension to Other Offices

If you have branch offices, you can extend the calling from those offices to be transmitted over one GS8 modular gateway, so you don't need to have multiple gateways in each office.

The configuration shown in figure 1 permits the remote office to use the gateway at the main office thereby reducing communications costs in that office, too.

Figure 1



Application: Use for Backup Communications

If you are using an IP PBX as the communications, and that PBX is connected directly to an ITSP (internet telephony service provider), you can use the GS8 modular gateway to provide backup telephony in the event the internet service fails.

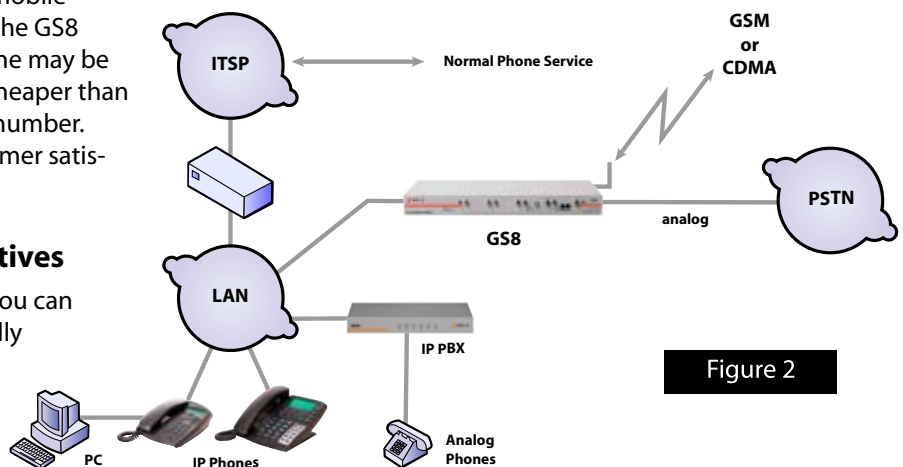


Figure 2

The configuration shown in figure 2 shows an office making and receiving its normal telephony with the ITSP. If that service fails, calls can be routed through the GS8 modular gateway to the PSTN or mobile networks.

Alternatively, calls may be routed to the GS8 modular gateway using a least cost routing (LCR) algorithm in your PBX. This LCR determines whether a call should be routed over the ITSP, the analog PSTN network, or over the GSM or CDMA network. The LCR is programmed to compare part or all of a dialled number against a list in a routing table and can, for example, cause calls to a mobile phone to be made from CDMA or GSM to mobile instead of land line to mobile.

Application: Connection to Traditional PBX

The GS8 modular gateway can connect to a traditional PBX to provide flexibility and low cost telephony calls. It can connect with the FXS or FXO modules.

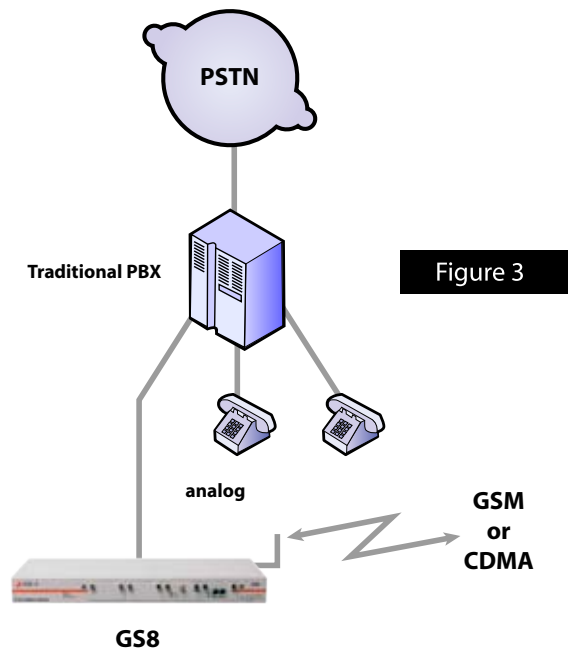


Figure 3

In the configuration shown in figure 3, the GS8 modular gateway is connected to standard analog ports on the PBX with an FXO module. The GSM or CDMA module or modules are mapped to these analog circuits. The GS8 modular gateway appears to the PBX as subscriber extensions. A call to the analog extension on the PBX will be routed automatically to a mobile phone. This seamlessly provides a mobile phone user with a wireless extension on the PBX.

You can choose whether incoming calls are private or public. A private call would be treated just like any extension call. The system can authenticate the caller and

either permit calls from only a specified mobile phone or prompt the caller for a password. A public call would be treated just like a call from the PSTN and always be routed to the operator or automated attendant.

In the configuration shown in figure 4, the GS8 modular gateway is connected to standard analog ports on the PBX with an FXS module. The GSM or CDMA module or modules are mapped to these analog circuits. The GS8 modular gateway appears like the PSTN (or central office) to the PBX. Outgoing and incoming calls to the mobile phone network can be treated identically to those to or from the PSTN.

You can use LCR on the PBX to determine if a call from the PBX should be routed to the GSM or CDMA network, or to the PSTN network. Again, call forwarding configured on the PBX can permit calls to a user to be automatically routed to a mobile phone.

Application: Reduction of Multiple Mobile Phones

In many parts of the world, there is fierce competition among the authorized mobile phone operators. They may charge little or nothing for calls to other phone numbers in their network and charge much for calls to phones on a competing network. This may force an executive to carry multiple mobile phones and publish multiple mobile phone numbers on his or her business card. Using the GS8 modular gateway as shown in figure 5 the executive now needs to carry only a single mobile phone.

The figure shows a GS8 modular gateway with four GSM or CDMA modules. The modules are registered with service providers 'A' to 'D.' The executive used to carry four mobile phones and now carries a single mobile phone, in this case the one registered with provider 'A.'

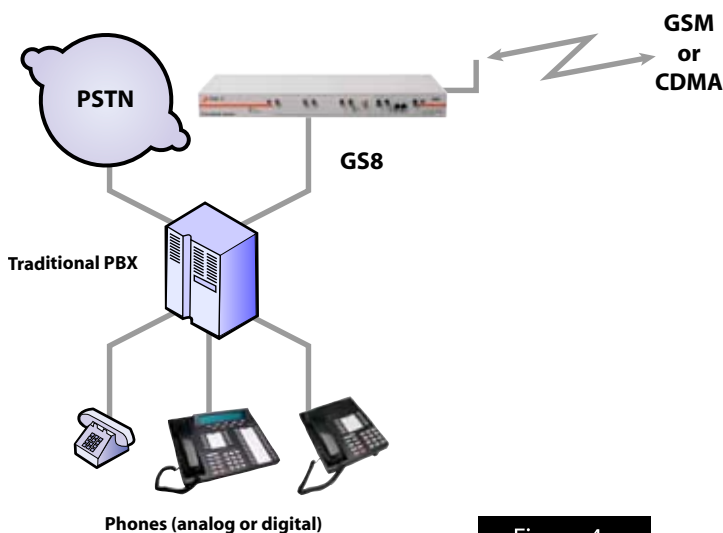


Figure 4

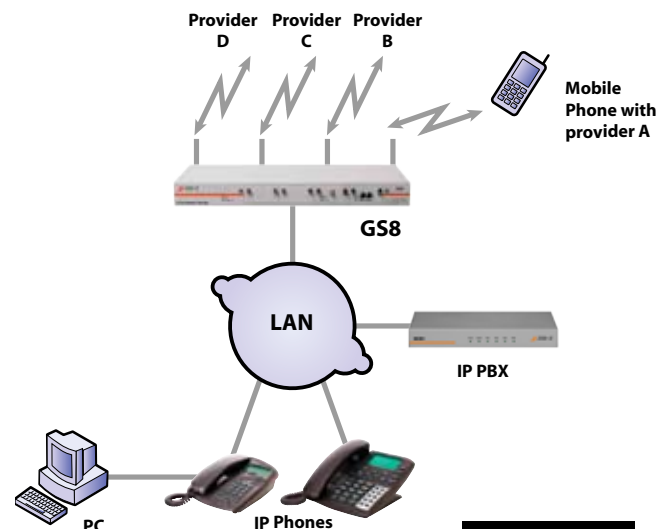


Figure 5

When a call is received on provider B's network, the PBX routes it to the executive's extension. The executive has a simple call forwarding rule to redirect all calls to the mobile phone (on provider A's network). This will probably be at zero cost and is transparent to the caller.

The GS8 modular gateway can operate in this mode completely stand alone, without any IP connection. It can be programmed to route any call received on any one of its ports to any other port. As the next example shows, it can operate this way in a cluster so this application can be extended to five or more mobile phone service providers. The scheme shown in figure 5 has the advantage that when the executive is in the office he or she can stop the call forwarding and receive all calls on his or her desk phone.

Application: Clustering of GS8 Modular Gateways without an IP PBX

Figure 6 shows how multiple GS8 modular gateways can be connected together to create a virtual GS8 modular gateway with increased capacity. A SIP call can be routed from one GS8 modular gateway to another GS8 modular gateway. The receiving GS8 modular gateway simply accepts the call and routes it based on the programmed routing strategy.

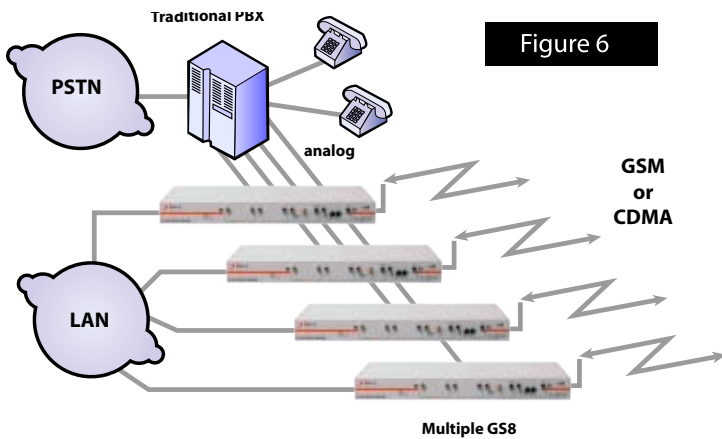


Figure 6

In this example an incoming call from the traditional PBX can go out to the GSM or CDMA network from any free GSM or CDMA port, and this GSM or CDMA module does not have to be in the same chassis as the analog module.

It is theoretically possible to extend this cluster of GS8 modular gateways without the limitation of location and number of nodes.

Application: Service Business using SMS

This shows how a business can improve customer satisfaction by sending (and receiving) SMS text messages to customers. Figure 7 shows a company that has a data base with details about the service provided to the customer and a small piece of middleware software that interfaces to the data base and communicates with the GS8

modular gateway either directly or through the IP PBX.

On a changing customer situation in the data base, the middleware can cause an SMS to be sent to the customer. It can receive a response from the customer and cause another action in the data base. This will all happen without anyone needing to initiate the transaction or gather any response.

One example might be a car repair garage. After a customer's car has been repaired or serviced, the data base is updated with the details of the service. The system can send an SMS to the customer to inform him or her that the car is ready and the total bill.

Another example might be a dental or optician office that schedules regular appointments with clients every six months or so. Usually, the practitioner will call the client prior to the appointment to ensure he or she has not forgotten and will confirm the appointment. Instead, the middleware is programmed to send a reminder by SMS a few days in advance and request that the client acknowledge attendance by replying "yes" or "no." A further reminder can be sent 12 hours before the appointment if required.

A third application is where a restaurant accepts reservations for booking a table. When the reservation is accepted the caller's mobile number is entered into the data base. The system sends an SMS to the caller with the address of the restaurant and a confirmation of the booking date and time. If the booking was made long in advance, the system can request confirmation of the appointment with an additional text message a few hours before the meal.

Each of these examples is less intrusive to the client, requires no intervention in the business, and improves customer satisfaction.

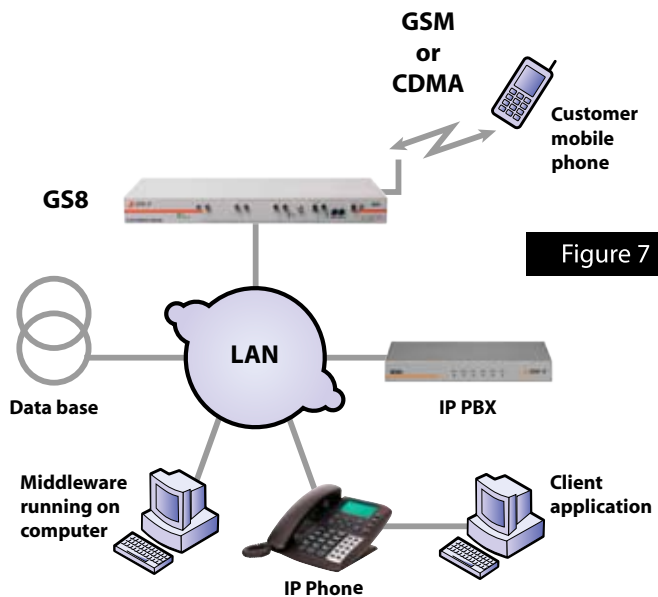
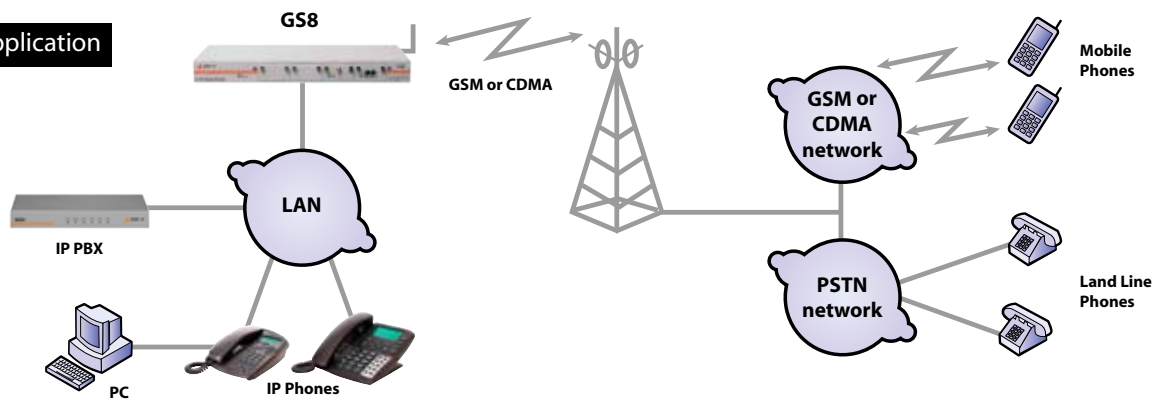


Figure 7

Basic Application



Specifications

Capacity

- 4 GSM ports (850 & 1900 MHz or 900 & 1800 MHz)
- 4 CDMA ports (800 MHz)
- 4 FXS ports (loop start)
- 8 FXO ports (loop start)
- Any mixture of interfaces is permitted
- 8 channels active simultaneously

Telephony and Messaging

- A-law and μ -law G.711, G.729A, G.723.1, GSM
- Automatic negotiation of codec
- Route audio between any interface
- Echo cancellation
- Fax support for Group III up to 9.6 kb/s with T.38
- Call progress tones for multiple regions
- Caller ID screening
- Call routing for received and transmitted calls without external PBX
- ASCII and Unicode characters for SMS messages
- 30 KB MMS (rich text and video)

VoIP and IP Networks

- SIP user agent and B2BUA (RFC3261 compliant endpoint)
- Operates with and without SIP registration
- Simultaneous registration to multiple proxies
- Dynamic jitter buffering
- Packet loss compensation
- Adaptive VAD with CNG
- IP TOS, 802.1p/Q VLAN tagging, and DiffServ
- DTMF signalling in band, RFC2833, or with SIP Info
- NTP

Configuration and Management

- HTTP interface (uses web browser)
- English and Chinese languages for administration
- Online upgrade with HTTP
- Configuration backup and restore
- Least cost routing
- RADIUS client
- Diagnostic tools: ping, tracer, DNS lookup, SIP route trace
- Comprehensive alarm and event records
- Access control list (ACL)
- SNMP trap

Hardware Specifications

- LED indicators on chassis and modules
- SMA connector on GSM and CDMA modules
- RJ11 connector(s) on analog modules
- Each GSM and CDMA module accommodates one SIM card
- Reset button
- One 10/100 Mb/s LAN port

Power

- External ac to dc power adapter
- Input: 100~240 Vac @ 47~63 Hz
- Power: 20 W

Physical and Environmental

Operating temperature: 10°C to 40°C (50°F to 104°F)

Storage temperature: 0°C to 50°C (32°F to 122°F)

Weight: 2.6 kg (5.7 lb). Shipping weight 3.9 kg (8.6 lb)

Size: 440 mm (W) x 225 mm (D) x 45 mm (H) (17.3" x 8.9" x 1.8")

Safety: FCC Part 68

EMI: FCC Part 15A

RoHS: Compliant



Zed-3

501 Valley Way

Milpitas, CA 95035

USA

Tel: +1-408-587-9333

Fax: +1-408-586-9038

E-mail: zed-3@zed-3.com

Web: www.zed-3.com