Manufactured by Cellbusters

MADE IN AMERICA

CELLBUSTERS

GSA Schedule Contract # GS-35F-155DA

Zone Protector™

Technical Specification Document

Specification item	Description
Purpose	To detect specified arbitrary RF off-air energy and raise an alert
Primary attributes	Highly configurable in terms of RF signal and method of alerting
Operation	Standalone, or networked as part of a system under Zone Manager™
Environmental	Passive Device, does not transmit. Enclosure needed for outdoor use.
Mechanical	235mm x 165mm x 30mm, desktop or wall mounted (bracket available)
RF detection frequency range	20MHz to 6020MHz
RF sensitivity	Can detect a cell-phone up to 30m or 150 feet. (Radius)
RF frequency accuracy	PLL synthesis referenced to a crystal oscillator typically ±50 ppm
RF frequency selection	Per table of adjustable "channels" defined in the configuration [1]
Receiver type	Double conversion super-heterodyne
Internal antenna	Wide-band patch type (not calibrated) (No longer present after 2022)
External antenna (not supplied)	Via SMA jack 50 ohm on rear panel [2] (Must be used after 2022 model)
Detector type (A)	Wide-band logarithmic envelope detector
Detector type (B)	Tuned logarithmic envelope detector
Detector (B) bandwidth	Approximately 15MHz
Basic detection method	RF signal level above threshold specified in channel configuration [1]
Optional enhanced detection	Envelope modulation analysis within adjustable criteria [3]
Alert logging	When detected an "alert event" will be logged
Event log operation	All events are recorded for immediate or future upload via data port

Event log size	3072 events can be stored before the most historic gets overwritten. Last 24 hour event log accessible via web interface.
Internal clock type	Real-time clock calendar (RTCC) “stamps” each event recorded [10]
Internal clock accuracy	Crystal controlled typically ±50 ppm
Internal clock synchronisation	Manual via web-interface, to NTP server [4], or to PC clock via USB
Local visual alert option	Visual alert: adjustable pattern of high-brightness LED display flashes [5]
Local audio alert option (jingle)	A ‘jingle’ or sequence of beeps is played [6]
Local audio alert option (clip)	A pre-recorded audio clip is played [7]
Local relay alert	A relay changeover volt-free contacts are actuated, rated 5A at 50V d.c.
Audio channels	Separately programmable channels for internal speaker and external jack
Audio clip storage capacity	Up to about 70 seconds arbitrarily split into 1 to 16 named audio clips
Audio clip recording method	Via web-interface from a wav file [7]
Internal speaker	50mm loudspeaker 1.5W approximately 85dB at 1m
Audio volume	4 separate controls for audio clips / jingles and for internal / external
Data port: RJ45	10BASE-T / 100BASE-T for web-interface, internet or Zone Manager™
Data port: USB	Type B for USB 2.0 full speed connection for future USB-interface [8]
Configuration method (A)	Via RJ45 “web-interface” from your web-browser (patch code supplied)
Configuration method (B)	Via USB “USB-interface” using future software to be made available
Configuration method (C)	Via RJ45 centralised configuration using Zone Manager™
Configuration backup / restore	The configuration may be backed up to a file via the web-interface [11]
Network parameters	Fully configurable IP settings. Response to ping can be disabled.
Internal battery	9.6V NiMH 2000mAh rechargeable battery pack. Optional Item
Battery life	Up to 5 hours typical usage between charges (low power mode)
External power / charging method (A)	Fully isolated Power Over Ethernet (POE) via your LAN
External power / charging method (B)	From your computer via USB (must be direct, not via hub) [8]
External power / charging method (C)	Using the mains adapter provided (100 to 240V a.c.)
Front panel indication: Status LED	Pulses green when ready to detect, amber when busy
Front panel indication: Alert LED's	Six high-brightness red LED's can be fired in any pattern [1]
Front panel MUTE button	Cancels the playing of an alert (can be disabled in the configuration) [9]
Rear panel controls:	
audio jack	Alternative audio output 3.5mm stereo (wired as mono) 600Ω line level
d.c. jack	2.1mm centre positive, for 5V regulated power input rated 2A
battery on-off switch	The battery will still charge when "off" but will not discharge
USB	Type B connector USB 2.0 full speed, Zone Protector acts as a "device"

RJ45	10/100BASE-T ethernet with standard isolated POE extraction
Relay contacts (changeover, volt-free)	3-pin 5mm box header with plug-in screw terminal supplied
External antenna	SMA jack 50 ohm
Reset switch	RESET button recessed behind 1.5mm diameter hole in rear panel [9]
Cover switch	Appropriate event is logged if cover is tampered with
Relay closure duration	Configurable between 0.1 and 65 seconds, optionally pauses detection
Normal reset method	Briefly press RESET button to reset device (as if power were cycled)
Factory reset method	Depress MUTE and RESET button until beep (about 5 seconds) [9]
Battery management	By battery voltage: future firmware may support fuel gauge technology
Firmware management	New firmware can be applied (when available) via the web-interface
Zone Manager™ functions	Remote control, covert detection, manage multiple units, etc
Possible future options (plug in card)	PIR detector, microphone, light and temperature sensors, WiFi analyser

NOTES

[1]. Up to 128 “channels” may be defined. Each channel specifies a range of RF frequencies to be detected and a threshold signal level above which an alert will be generated. The type of alert (visual, audio, none) can also be specified. The device is shipped with a number of preset channels that are designed to meet most needs.

[2]. An external antenna may be connected to the SMA jack on the rear panel to supplement the internal antenna especially at lower RF frequencies

[3]. RF envelope analysis e.g. to detect the 216Hz repetition rate peculiar to GSM signals

[4]. Assuming Zone Protector™ is connected to a LAN, a NTP server can be specified via the web-interface after which the device will synchronise periodically to it.

[5]. In principle up to 16 arbitrary sequences of LED flashes can be programmed, but this is currently only available via the USB-interface software for which is yet to be released. One or more sample LED sequences are shipped with the device.

[6]. In principle up to 16 arbitrary sequences of beeps or “jingles” can be programmed, but this is currently only available via the USB-interface software for which is yet to be released. One or more sample jingles are shipped with the device.

[7]. The device is shipped with one or more sample audio clips. These may be deleted and others downloaded to the device via the web-interface. The device accepts the standard uncompressed wav file format. The wav file may be stereo or mono and any sample rate: the device will convert the file to its native mono and 22050 samples per second format. Currently audio clips may not be deleted or edited individually. You can add an audio clip (within the limit of 16 clips and no more than 70 seconds total for all clips), or delete all the stored clips and start over.

[8]. The device is USB 2.0 Full Speed ready. The current firmware supports a limited USB-interface protocol intended for diagnostics. A future firmware release is planned that will extend this protocol and allow users to configure the device this way as an alternative to the web-interface. The planned USB-interface will have features additional to the web-interface such as editing LED sequences and jingles, and resetting the network parameters. Currently the only way to reset the network parameters (should communication via the RJ45 port become lost) is to execute a “factory reset”.

[9]. The MUTE and RESET buttons in combination perform various reset functions:

[10]. The repertoire of events recorded by the device, and the parameters they quote, are detailed in the relevant protocol definition documentation. The events recorded during the last 24 hours may be viewed via the web-interface.

[11]. Configuration backup can be carried out via the web-interface by clicking the ‘Backup’ button. This process copies the entire device configuration to a computer disk file named “backup.zip” which can then be restored at a later time by clicking the ‘Restore’ button and selecting the file. The restore process re-instates the entire configuration including the RF calibration. The only part that does not get overwritten is the System UpTime and other internal counters. The event log is not affected by this process apart from an event being recorded to that effect. This feature provides a means to synchronise the configuration of a number of Zone Protector devices, or for a particular configuration template to be supplied e.g. by Cellbusters to a customer. For example it is not yet possible to edit or create LED alert sequences or jingles via the web-interface, but new ones could be supplied via a backup file.

[12] RF sensitivity is very difficult to measure due to the vagaries of RF. The device consists of an internal antenna and RF detection circuit. The gain of the antenna, in particular, is highly dependent on the frequency. The location of the Zone Protector device with respect to the target RF source and walls and other clutter will have a large effect on the perceived sensitivity. Tests have been carried out that suggest that, for example, a 900MHz GSM cell phone can be detected at a range of up to 30m.

Further functions may be added in future firmware releases.