BridgeWay® M34100 Radio Gateway System

PDS-XT10001 Rev D

System Overview

The BridgeWay M34100 voice over IP (VoIP) networked radio and intercom communications gateway is ideally suited for use in satellite linked airborne, shelter and ground mobile platforms. The M34100 is certified to MIL-STD and DO-160 for land mobile and aircraft platforms operating in extreme environments.

M34100 supports multiple simultaneous radio repeater, cross-patch, radio net and surveillance connections while dramatically reducing SWaP (size, weight and power) requirements over previous generation technology.

BridgeWay M34100 integrates 4 radio audio and 4 radio serial control ports, a VoIP Gateway, radio controller, communications switch, conference bridge, client server and call manager into a single SWaP optimized system.

The M34100 embedded radio controller provides remote control of radio configuration, patching and real time operations.

BridgeWay systems are configurable via an IP networked operation, administration and maintenance PC. Multiple BridgeWay systems may be networked and console operators may log into any networked terminal.

Tactical Communications offers a BridgeWay compatible line of rugged operator terminals, intercom crew stations and headset boxes for airborne, marine and ground communication platforms.

Radio Controller

Bridgeway analog radio/audio ports feature transformer isolated 4-wire audio, Carrier Operated Relay (COR) inputs and relay operated PTT transmit control. Each radio port has 600 ohm and 150 ohm line outputs and an RS232/422/485 serial data port.

VoIP Gateway

The VoIP Gateway feature interoperates VoIP networked devices, such as SIP telephones and IP PBXs, PC laptops and computer workstations, with TDM devices, such as radios, headsets, intercoms, analog and digital telephone lines and PBXs.

The M34100 VoIP Gateway networks SIP VoIP terminal devices, with comprehensive features, including G.7xx and MELPe vocoders, programmable jitter buffers and sample rates, multicast/unicast, RTP/RTCP and dual independent Ethernet LAN connections.

BridgeWay software supports a mix of telephone line types, radios and conference nets. The embedded call manager allows VoIP devices to direct dial any TDM device or conference net and vice-versa. Callers hear standard call progress tones and intuitively know how to operate the system.

M34100

Remote Communications

BridgeWay operators may remotely configure radios equipped with serial or Ethernet interface ports from their MC² console GUI.

BridgeWay communications features will reliably operate over WAN networks, including connections over multi-hop satellite networks.

Client GUI

BridgeWay client GUI software includes pages for monitoring and transmit selection of multiple radio and intercom nets, softphone, patching and relay connections, remote radio configuration and BIT.

Client GUIs may be configured for individual operator or position requirements and are mission configurable.

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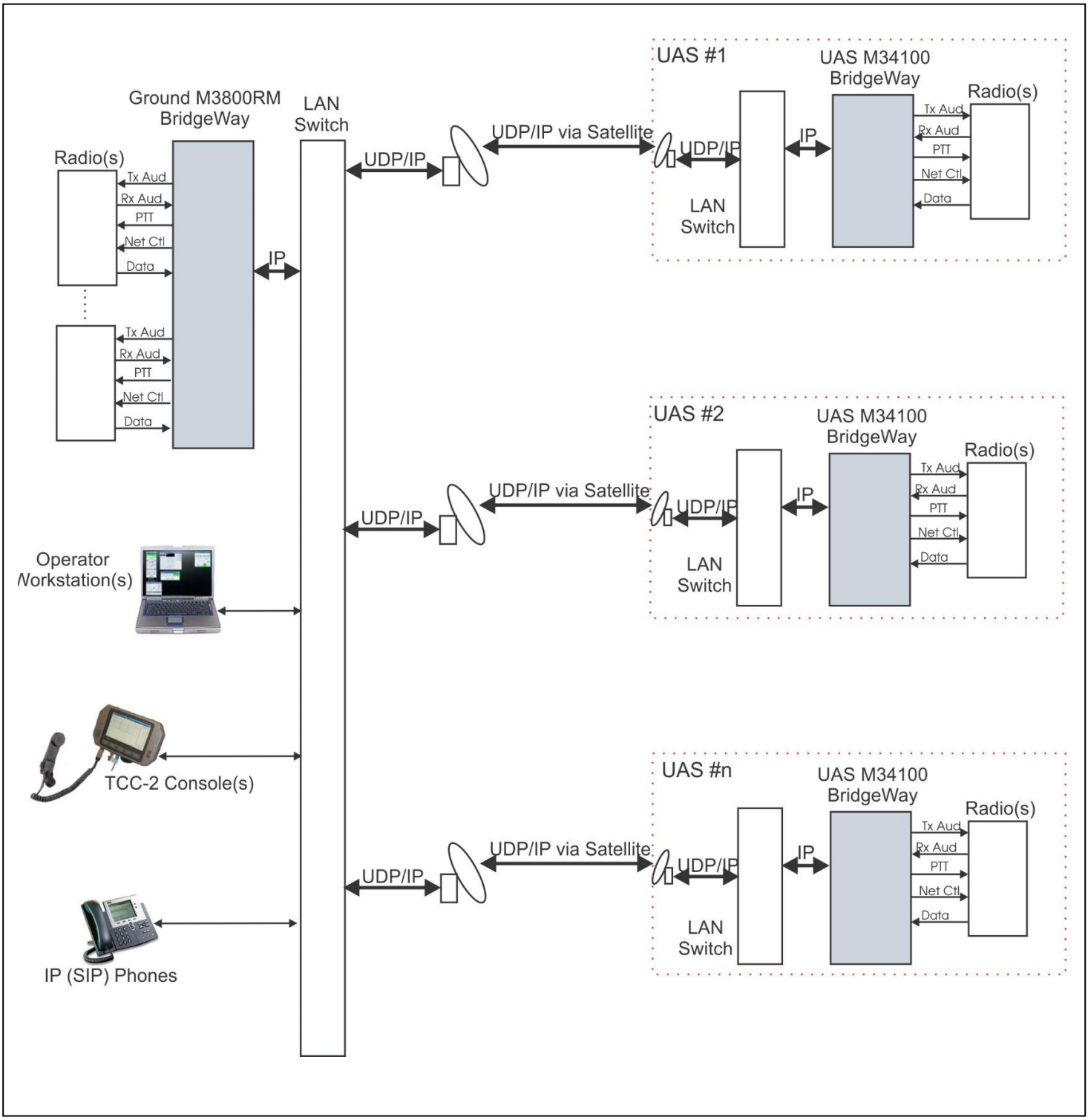

Typical Ground-UAS Network

FEATURES AND BENEFITS

- 2/4 wire 600 ohm and 150 ohm transformer isolated audio interfaces with software programmable I/O gain adapt to all radio types
- Programmable PTT + COR signal lines provide universal compatibility with radio base station and repeater equipment
- Software programmable remote radio configuration option adapts to all types of radios equipped with RS232/422/485 serial digital or IP ports
- Programmable remote radio configuration features include: channel selection, squelch bypass, modulation type, BIT, power, encryption and more
- Uplink/downlink codec options include G.711, G.729 and MELPe, with Symmetrical or Asymmetrical uplink and downlink settings. AES link encryption (128, 192 and 256 bit) is also available
- Automated call routing feature allows networked user dial access to multiple combat net radios, intercom nets and meet-me conference
- Configurable voice detect and IP packet detect VOX transmit control modes
- MC² operator terminal GUI features simultaneous monitoring/mixing of multiple channels with individual gain control, multi-channel intercom, soft phone, simulcast, patching, personalized operator screen configurations, remote radio configuration and more
- Operator may simulcast transmissions to all users, or a selected group of users, efficiently handling group and emergency communications
- IP Link between the M34100 and operator terminals may be configured with AES encryption
- SIP or H.323 Gateway includes standard G.7xx vocoders, jitter buffering, AGC and echo cancellation for universal VoIP terminal compatibility
- Remote software and configuration updates to on board secured flash
- Built-in test (BIT) and remotely activated self-test facilitates high availability operation
- Built-in conference bridge supports multiple simultaneous intercom and combat radio nets
- Selectable PTT control or full duplex operation on IP and analog phones
- Downloadable configuration files allows plug and play mission profiles
- Language packs allow operator console GUI's to display in any desired language
- Operator remote control of radio configuration, Including transmit power, modulation, squelch, BIT, frequency/channel set/select, encryption control, guard channel configuration/receive

BRIDGEWAY SOFTWARE

BridgeWay includes Tactical Communications' MC² embedded call manager application software. The MC² call manager application supports compatible BridgeWay client GUI or third party GUI software products.

MC² call manager software networks multiple BridgeWay system nodes, allowing operators to access all BridgeWay connected radios or to login via any LAN-connected VoIP terminal.

The embedded MC² call manager and web server eliminates the necessity for external equipment. The BridgeWay JAVA programmed client GUI may be easily configured to meet unique requirements.

MC² CLIENT GUI

The MC² Client GUI allows operators to communicate via VoIP with multiple radios and telephones, and to set up radio-telephone patches and intercom nets. The MC² Client GUI will run on any laptop, computer or workstation supporting standard JAVA scripts.

Tactical Communications offers BridgeWay MC² client GUI software customized to specific project requirements.

BRIDGEWAY POWER

The M34100 system operates from 28V DC power in accordance with MIL-STD-704A. Requiring 8 Watts, BridgeWay generates minimal heat, increasing reliability and enhancing environmental performance.

BRIDGEWAY M34100 I/O INTERFACE SPECIFICATIONS		
AUDIO SIGNAL	**DESIGNATION**	**SPECIFICATION**
Line Inputs	Line In	Up to 24V pk-pk, balanced 600 ohm transformer isolated and transient protected inputs. D38999 connector.
Line Outputs	Line Out	0-18V pk-pk, 600 ohm and 0-4V pk-pk 150 ohm balanced transformer isolated and transient protected outputs. D38999 connector.
Audio Bandwidth	BW	Bandwidth 150Hz - 3.4Khz, +/- 1dB
Channel – Channel Isolation		> 100dB
RADIO CONTROL	**DESIGNATION**	**SPECIFICATION**
COR Inputs	COR	Contact closure or voltage inputs. Inputs pulled up to +5V DC through a 51k resistor. Software programmable trigger voltage. D38999 connector.
XMIT Control Outputs	XMIT	Normally Open relay contact closure. D38999 connector.
Radio Control RS232 Ports	RS232 #1-8	1.2K – 115.2Kbps RS232 serial ports. Rx,Tx, signal ground. D38999 connector.
Radio Control RS485/422 Ports	RS485/422 #1-8	1.2K – 115.2Kbps RS485 or RS422 2/4 wire serial port. D38999 connector.
COM NETWORKS	**DESIGNATION**	**SPECIFICATION**
10/100bT Ethernets	10/100bT VoIP Ports	Dual independent IEEE STD 802.3 10/100bT Ethernet LANs. D38999 connector.
RS232 Maintenance Port	RS232	1.2K – 115.2Kbps RS232 serial port. Rx, Tx, signal ground. D38999 connector.
RADIO CONTROL	**DESIGNATION**	**SPECIFICATION**
Serial Digital	RRC	- Select channel presets - Selection Modulation Type - Tx power level - Set channel Frequency - Squelch Disable - Run BIT - Encryption Control - Guard control/receive

SPECIFICATION	PARAMETERS	MIL/DO-160 STANDARD
Altitude (storage)	+60,000 feet	MIL-STD-810F, Method 500.4, Procedure I
Altitude (operational)	+50,000 feet	MIL-STD-810F, Method 500.4, Procedure II
Storage Temperature	-55^0 C to +85^0 C	MIL-STD-810F, Method 501.4, Procedure I. MIL-STD-810F, Method 502.4, Procedure I
Operational Temperature	-40^0 C to +70^0 C	MIL-STD-810F, Method 501.4, Procedure II, MIL-STD-810F, Method 502.4, Procedure II
Humidity	0 - 95%, non-condensing	MIL-STD-810F, Method 507.4
Salt Fog	48 hour exposure at 5% concentration	MIL-STD-810F, Method 509.4
Fungus	QM474/ATCC11730 with28 to 84 day exposure	MIL-STD-810F, Method 508.5
Rain	30 minutes at >1.7mm/min, droplet size 0.5mm to 4.5mm	MIL-STD-810F, Method 506.4, Procedure III
Dust	Blowing dust	MIL-STD-810F, Method 510.4, Procedure I
Vibration (transport)	3 hour/axis	MIL-STD-810F, Method 514.5
Vibration (flight)	80 min/axis	MIL-STD-810F, Method 514.5, Category 13
Shock – bench handling	20G, 15ms, COF 45Hz	MIL-STD-810F, Method 516.5, Procedure VI
Shock – transit drop	Functional Aircraft Shock, 20G 15msec, Saw-Tooth	MIL-STD-810F, Method 516.5, Procedure IV
Acceleration	Structural Levels 7g, operation levels 4.5g;	MIL-STD-810F, Method 513.5, Procedure I
Fluids contamination	< 8 hours	MIL-STD-810F, Method 504
Explosive Atmosphere	Fuel injection @ 41,700 feet	MIL-STD-810G, Method 511.5, Procedure I
Lightning induced transient susceptibility	Category B3K4L4	DO-160G, Section 22
Electrostatic discharge	Category A	DO-160G, Section 25
CE102	10KHz to 10MHz	MIL-STD-461F
CS101	30Hz to 150KHz	MIL-STD-461F
CS114	10KHz to 200MHz	MIL-STD-461F
CS115	30Hz rate for 1 minute	MIL-STD-461F
CS116	10KHz to 100 MHz	MIL-STD-461F
RE102	10KHz to 18GHz	MIL-STD-461F
RS103	2MHz to 18GHz	MIL-STD-461F

PARAMETER	*SPECIFICATION*
Dimensions (Note 1)	9.32" (246.73mm) L x 6.9" (175.26mm) W x 1.80" (45.72mm) H
Weight	3.0 lb. (1.36kg)
Power (Note 2)	9-36V DC @ 8 Watts. IAW MIL-STD-704A
Reliability	125,000 Hours MIL-HDBK-217F
Input power Transient Testing	MIL-STD-704A
SIP	RFC3261 SIP; RFC1889 RTP; RFC2327 SDP; RFC2833 RTP for DTMF Digits

Note 1: Dimensions do not include connector protrusion
Note 2: Power does not include FXS option, which requires additional 6 watts.

M34100 ORDERING INFORMATION	
M34100 COMPONENTS	**PART NUMBER**
4 Port Radio Gateway System	M34100
Remote Radio Configuration License	RRC-4
Telecom option module with 4 FXO + 4 FXS	TM446
Headset adapter for direct analog connection to M34100	HAS-01

Specifications subject to change without notice
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US patents 8,442,506 and 9,154,630

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