PDS-XT10045 Rev D

SYSTEM OVERVIEW

The M400/M800 system provides SIP and H.323 voice over Internet protocol (VoIP) communications between mobile radio, SATCOM terminals, telephone systems, user headsets and VoIP networked communication terminals. The M400 and M800 BridgeWay systems are designed for operations in a mobile vehicle environment.

BridgeWay supports multiple simultaneous radio repeater, cross-patch, conference and intercom network connections. An embedded TDM switch provides dial access to combat radio and intercom nets from IP phones, PCs and legacy telephones.

The BridgeWay system provides next generation radio and intercom communications capabilities while dramatically reducing SWaP (size, weight and power) requirements over previous generation technology.

BridgeWay integrates 4 (M400) or 8 (M800) radio ports, a VoIP Gateway, communications softswitch, client server and Call Manager into a single compact, lightweight and low power vehicle based system.

Plug in telecom option cards for the M400/M800 support up to 8 FXO lines, 8 FXS lines and a single Primary Rate ISDN T1/E1 span or 4 FXO lines, 4 FXS lines and 2 E&M trunks (available on the M800 and M800RM only).

Tactical Communications offers a BridgeWay compatible line of rugged mobile PC operator terminals, intercom stations and headset boxes. BridgeWay systems are configurable via a network connected administration and maintenance PC.

BridgeWay systems may be networked and console operators may login any networked terminal.

RADIO PORTS

Each BridgeWay analog radio/audio port features transformer isolated 4-wire audio, Carrier Operated Relay (COR) inputs, relay operated transmit control outputs and RS232/422/485 serial control ports.

VoIP GATEWAY

The BridgeWay SIP Gateway supports up to 20 VoIP terminal devices, such as IP telephones, PC laptops and operator workstations.

An unlimited number of operator positions may be supported when using the VHI audio server in conjunction with the operator workstation.

M400

REMOTE RADIO CONFIGURATION AND DATA COMMUNICATIONS

BridgeWay may remotely control radios from a PC operator console GUI, including net select, squelch disable, modulation type, power, guard channel, BIT and more.

BridgeWay's radio configuration messaging protocols are programmable for compatibility to all radios with RS232/422/485 or Ethernet ports.

BridgeWay may also transmit and receive data between IP networked operator terminals and RS232/422/485 radio data ports.

BRIDGEWAY POWER

The M400 and M800 BridgeWay systems operate from 9-36V DC vehicle power, or from 110/220V AC power with an auto-switching external power pack.

FEATURES AND BENEFITS

- 2/4 wire 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 RS232/485 serial digital or IP ports

- Programmable remote radio configuration features include: net selection, squelch bypass, modulation type, power, BIT and more

- VoIP Gateway interoperates radio and telephone systems with industry standard SIP or H.323 PCs, communication terminals, IP phones, iPBX and Call Manager systems

- Automated call routing feature allows networked user dial access to multiple combat net radios, intercom nets, phone lines and meet-me conferences

- MC^2 operator terminal GUI features simultaneous monitoring/mixing of multiple channels with individual gain control, multi-channel intercom, soft phone, simulcast, personalized operator screen configurations, remote radio control and more

- Optional T1/E1 ISDN, E&M, FXO or FXS ports network BridgeWay with PBX, PSTN, cellular, legacy POTS or SATCOM equipment

- Operator may simulcast transmissions to all users, or a selected group of users, efficiently handling group and emergency communications

- SIP and H.323 Gateway includes standard G.7xx vocoders, jitter buffering, CNG, AGC and echo cancellation for universal VoIP terminal compatibility

- Configurable voice detect and IP packet detect VOX transmit control modes

- Remote software and configuration updates to onboard flash

- Built in test (BIT) and remotely activated self-test facilitates high availability operation

- AES encryption can be configured for remote radio links

- Optional vocoders include MELPe, LPC-10e and more

- BridgeWay may be configured for full duplex or half duplex (PTT) communications with SIP phones. Multiple SIP phones may join the same radio net or conference

BRIDGEWAY SOFTWARE

BridgeWay includes Tactical's MC^2 embedded Call Manager application software. The MC^2 Call Manager application supports compatible BridgeWay client GUI software products.

MC^2 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.
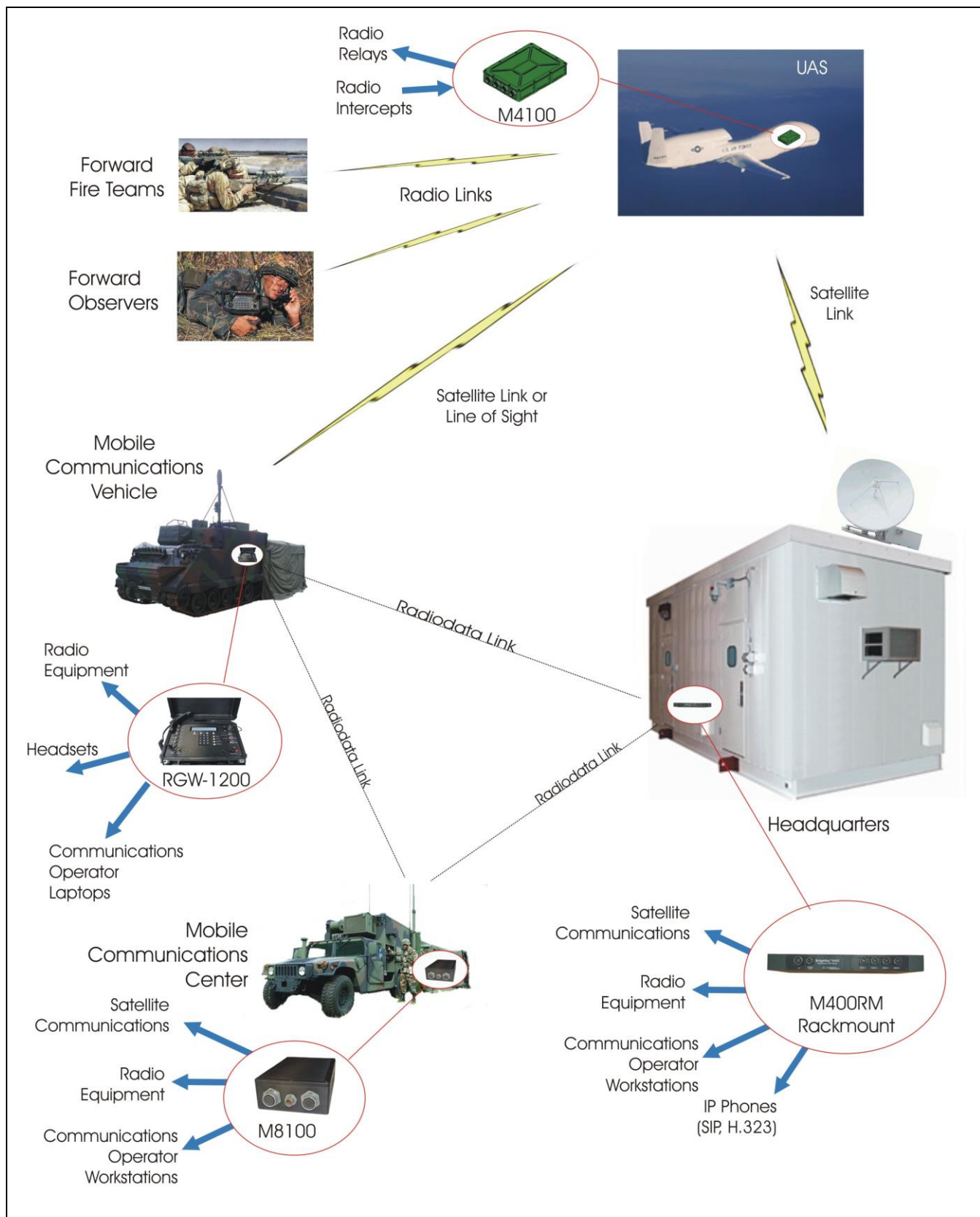
The embedded MC^2 Call Manager and web server eliminates the external server and Call Manager equipment typically required when using third party software GUIs, or when BridgeWay is connected to external telephone systems.

The BridgeWay JAVA programmed client GUI may be easily configured to meet unique requirements.

MC^2 CLIENT GUI

The MC^2 Client GUI allows operators to communicate via VoIP with multiple radios and telephones, and to setup radio-telephone patches and intercom nets. The MC^2 Client GUI will run on any laptop, computer or workstation supporting standard JAVA scripts.

Tactical offers BridgeWay MC^2 client GUI software customized to specific project requirements. The GUI labels may be displayed in any language.

Radio
Relays

Radio
Intercepts

M4100

UAS

Forward
Fire Teams

Forward
Observers

Radio Links

Satellite
Link

Satellite Link or
Line of Sight

Mobile
Communications
Vehicle

Radiodata Link

Radiodata Link

Radiodata Link

Radio
Equipment

Headsets

RGW-1200

Communications
Operator
Laptops

Headquarters

Satellite
Communications

Radio
Equipment

Communications
Operator
Workstations

IP Phones
(SIP, H.323)

M400RM
Rackmount

Mobile
Communications
Center

Satellite
Communications

Radio
Equipment

Communications
Operator
Workstations

M8100

TACTICAL RADIO INTERCOM NETWORK

GENERAL SPECIFICATIONS		
MODEL	DIMENSIONS (NOTE 1) AND WEIGHT	POWER
M400	10.25" (260mm) L x 6.75" (171 mm) W x 1.7" (43.2 mm) H, 2.25lb (1Kg.)	12-32V DC @ 8 Watts. (Note 2)
M800	10.25" (260mm) L x 6.1" (155 mm) W x 3.5" (89 mm) H, 2.5lb (1.1Kg.)	12-32V DC @ 8 Watts. (Note 2)
M400 and M800 are also available in 1U (1.75" high) rack mounted configurations, model numbers M400RM and M800RM.		

Note 1: Dimensions do not include connector protrusion.
Note 2: Add 8 Watts for telecom option. Power 9-32V DC if telecom option not included

BRIDGEWAY ORDERING INFORMATION	
M400/M800 SYSTEM COMPONENTS	PART NUMBER
4 Port Mobile	M400
8 Port Mobile	M800
M400/M800 FEATURE OPTIONS	PART NUMBER
Remote Radio Configuration License, xxx = Radio Type	RRC-xxx
MC^2 Console GUI license, xxx = seat capacity	GUI-xxx
(4) FXO, (4) FXS + PRI ISDN T1/E1 option card	TM440
(4) FXO + (4) FXS expansion (M800 only)	TM441
(4) FXO, (4) FXS + (2) E&M (M800 only)	TM445
(4) FXO, (4) FXS option card	TM446
110/220V AC power adapter (M Series)	MPWR

BRIDGEWAY M400/M800 I/O INTERFACE SPECIFICATIONS		
AUDIO SIGNAL	**AUDIO SIGNAL**	**AUDIO SIGNAL**
Line Inputs	Line In	Up to 24V pk-pk, 1V typical, balanced 600 ohm transformer isolated and transient protected inputs. D38999 connector.
Line Outputs	Line Out	0-18V pk-pk, 600 ohm and 0 – 1V pk-pk 150 ohm balanced transformer isolated and transient protected outputs. 150 ohm output allows direct connect to H-250 radio handset connections. D38999 connector.
Audio Bandwidth	BW	Bandwidth 150Hz-3.4Khz, +/- 1dB. Wider bandwidth available, contact Tactical Communications for details
Channel-Channel Isolation		> - 100dB
RADIO CONTROL	**RADIO CONTROL**	**RADIO CONTROL**
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	Radio RS232 #1-8	1.2K – 115.2Kbps RS232 serial ports. Rx, Tx, signal ground. D38999 connector. Ports 1-4 (M400) or 1-8 (M800)
Radio Control RS485/422 Ports	Radio RS485/422 #1-8	1.2K – 115.2Kbps RS485 or RS422 2/4 wire serial port. D38999 connector. Ports 1-4 (M400) or 1-8 (M800)
COM NETWORKS	**COM NETWORKS**	**COM NETWORKS**
10/100bT Ethernet	10/100bT VoIP Port	IEEE STD 802.3 10/100bT Ethernet LAN. D38999 connector, "L" suffix; RJ45 Connector "A" suffix
RS232 Maintenance Port	RS232	1.2K – 115.2Kbps RS232 serial port. Rx, Tx, signal ground. D38999 connector.
FXO Ports	FXO Ports	Global standard FXO operation. Ring detection. DTMF and call progress signaling. Line transient protection and status indicator. D38999 connector.
FXS Ports	FXS Ports	Global standard FXS operation. Ring voltage and loop current, DTMF and call progress (dial tone/busy) signaling. Line transient protection and status indicator. D38999 connector
T1/E1 Port	T1-E1 Port	Global standards for T1 and E1 operation. PRI ISDN and Q.SIG signaling. D38999 connector.
RADIO CONTROL	**RADIO CONTROL**	**RADIO CONTROL**
Serial Control Port	RRC	- Net Selection - Guard receive - Modulation type select - Squelch disable - TX power level - BIT activate/report

REMOTE RADIO CONTROL SIGNALING	
Conventional Control	Universal interface for conventional E&M and tone remote controlled radios. Universal software programmable interface.
Digital Radios Control	RS232/422/485 serial port control interfaces. Off the shelf protocols to match the messaging format of most popular digitally controlled radios; contact Tactical Communications for specific details.
IP Radios	10/100bT Ethernet interface for VoIP and Control Interfaces. Off the shelf protocols to match the messaging format of most IP controlled radios; contact Tactical Communications for specific details.

SPECIFICATION	PARAMETERS
Storage Temperature	-55^0 C to 85^0 C
Operating Temperature	-40^0 C to 60^0 C
Vibration	5 ~ 2,000Hz 4.5G RMS random vibration
Shock	30G peak acceleration, 11 msec. duration
Operating and non-operating (storage) humidity	0 to 95% non-condensing
EMI	MIL-STD-461F
Reliability	125,000 Hours
Power	MIL-STD-1275E
Guidelines	MIL-STD-454B and MIL-STD-188-124B

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