

SYSTEM OVERVIEW

The Apex 2000 provides RoIP (Radio over IP) and telecommunications interoperability for mission critical public safety and homeland security markets.

The Apex 2000 system combines an RoIP gateway, call manager and conference bridge to cross-connect radio, SATCOM, GSM/CDMA, local system operator, cellular and wire line telephone systems with SIP phones, IP PBX's, workstations and PCs.

Apex supports multiple simultaneous radio repeater, cross-patch and conference network connections. An embedded Call Manager provides unattended dial access to conference nets from any Apex 2000 networked device.

Apex integrates up to 6 radio ports, 6 serial data ports, 4 FXO and 4 FXS "POTS" ports, PRI E1/T1, operator panel, SIP VoIP gateway, softswitch, call manager and client server into a single rugged, light weight and low power rack mount chassis.

APEX OPERATOR PANEL

The Apex operator panel includes a telephone dial keypad, radio control keys, patch panel and system configuration keys. A 4x40 LCD displays configuration and LED's show current port status.

The panel includes a connector for a PTT controlled headset with ANR power and volume control. A speaker with volume control monitors unselected radio audio and telephone call alerting.

The telephone dial keypad allows operator direct dial access to VoIP networked resources, including conference nets, IP phones, radios and telephone/PBX systems. The Apex 2000 operator may intercom with other networked operators.

VOIP GATEWAY

The Apex SIP/RoIP gateway supports up to 20 VoIP terminal devices, i.e., IP telephones, PC laptops and operator workstations.

APEX 2000



RADIO PORTS

The radio ports feature transformer isolated 4-wire audio, carrier operated relay (COR) inputs, relay operated PTT transmit control and configurable RS-232/422/485 serial interface. Status display indicates individual radio receive/transmit activity.

Radio interface parameters, such as input/output levels and audio delay are field programmable, providing a universal radio interface capability.

DATA GATEWAY

Apex supports C4i tactical data communications between radios and IP networked communication devices. The data gateway supports a variety of data communication types, including email, text messages, GPS location information and images.

SYSTEM CONFIGURATION

Apex systems are configurable via a remote network connected administrator PC or the front panel keyboard. Configuration is stored in on-board non-volatile "flash" memory.

The Apex 2000 operator may configure and join multiple conference nets in any combination of radios, telephones and SIP terminals from the front panel or administrator PC GUI.

The Apex 2000 administrator may pre-configure the system for a variety of mission scenarios, including multiple radio net and user group assignments.

Mission scenarios may be selected from the operator panel, allowing simple use of the Apex 2000 without requiring reference to complex operating instructions.

FEATURES AND BENEFITS

- 2/4 wire transformer isolated radio interfaces with software programmable I/O gain and audio delay adapt to all radio types
- Programmable PTT + COR signal lines provide fast universal radio and repeater interfaces
- VoIP Gateway interoperates with SIP PCs, IP phones and call manager systems
- Call Manager allows user dial access to multiple radios, intercom nets and meet me conferences
- Configurable Voice and IP packet speech detect algorithms provide reliable operation in noisy environments
- FXO, FXS, E&M and PRI E1/T1 ports network Apex with PBX, PSTN, cellular, legacy POTS or SATCOM equipment
- Operator may configure the system and set up radio patches, efficiently handling group and emergency communications.
- SIP/RoIP gateway includes standard G.7xx vocoders, AGC programmable jitter buffering and sample size for universal compatibility with VoIP terminal devices and other gateways
- Operator calling is supported by standard telephone call progress tones, allowing use by untrained operators
- Software and configuration updates are stored to on board flash memory, allowing for operation in extreme environments
- Dual 10/100bT LAN/WAN ports support simultaneous operation of an administrative PC and SIP network
- True VoIP gateway allows multiple SIP users to dial access any radio or conference net
- Multiple multi-party conference nets may operate simultaneously
- IP and analog phones may use * and # keys for PTT control

- Low power operation extends optional local battery life and allows operation at elevated temperatures
- Operator controlled Built-in-test (BIT) and remotely activated self-test facilitates high availability operation
- Cabling between the processor module and the operator control panel is fully connectorized, speeding field maintenance
- DSP audio processing with programmable frequency shaping and filtering achieves high quality low noise audio
- Apex 2000 supports connections between VoIP gateways and remote operator devices over encrypted networks

APEX 2000 SOFTWARE

The Apex 2000 includes APEX embedded Call Manager application software, allowing users dial access all Apex connected radios, telephone lines and LAN-connected VoIP terminals.

The embedded APEX web server allows local or remote management and configuration of the Apex 2000 features from any PC supporting a web browser.

APEX CLIENT GUI

The APEX Client GUI allows multiple dispatch operators to communicate via VoIP with Apex 2000 controlled radios, telephones and intercom nets.

The GUI features simultaneous monitoring/mixing of multiple channels with individual gain control, multi-channel intercom, soft phone, simulcast, and personalized operator screen configurations. The APEX Client GUI will run on any laptop, computer or workstation supporting standard JAVA scripts.

APEX 2000 POWER

The Apex 2000 requires 20 Watts at 9-56V DC from an external battery, or 110/230V AC power. The Apex 2000 may also operate from a local battery pack.

Mobile Command Post



Portable Communication

Portable & Team Communication



Remote Site



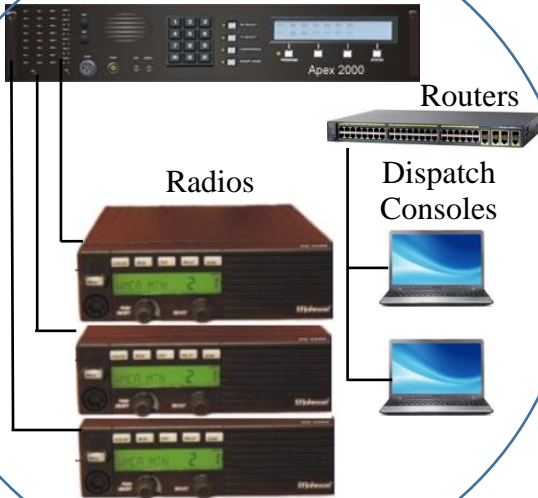
Vehicle Communications

IP

Primary Communications Center

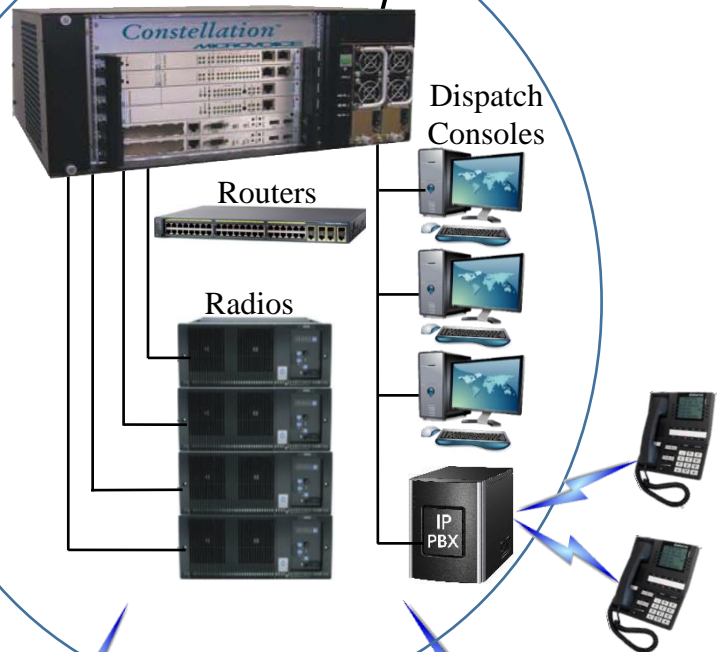


APEX 2000



Radiodata

CONSTELLATION®



APEX 1000

Vehicle Communications



Portable & Team Communication

RADIO AUDIO	APEX 2000 SPECIFICATIONS
Radio Inputs	Up to 18V pk-pk, 1V typical, balanced 600 ohm transformer isolated and transient protected inputs.
Radio Outputs	0-18V pk-pk, 600 ohm and 0-1V pk-pk, 150 ohm balanced transformer isolated and transient protected outputs.
Programmable Interface	Software programmable input/output gain control over an 80dB range. Programmable audio buffer delays.
Audio Bandwidth	Bandwidth 150Hz-3.4Khz, +/- 1dB.
RADIO SIGNALING	SPECIFICATIONS
COR Inputs	Contact closure or signal logic input levels. Inputs pulled up to +5V DC through a 51k resistor. Receive status indicator. On DB-15 radio connector.
PTT Control Outputs	Normally Open relay contact closure. DB-15 radio connector.
SERIAL DATA PORTS	SPECIFICATIONS
Serial Ports	Software selectable RS232/485 serial data ports, 9,600bps – 115.2Kbps, paired with each radio port on DB-15 connector. Format translation between IP network and radio serial data ports.
COM DEVICES	SPECIFICATIONS
Dual 10/100bT Ethernet	IEEE STD 802.3 10/100bT Ethernet LAN. RJ45 connector.
FXO ports	Global standard FXO operation. Ring detection. DTMF and call progress signaling. Line transient protection and status indicator. DB-25 connector.
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. DB-25 connector.
E1/T1 port	Global standards for E1 and T1 operation. PRI ISDN and Q.SIG signaling. RJ41 connector
Handset	U-329/U connector for H-251/U handset or aviation type ANR headsets.
Maintenance port	9,600bps – 115.2Kbps RS232 serial data. Rx, Tx, signal ground. DB-9 connector.
CONFERENCE NETS	SPECIFICATIONS
Conference Nets	Simultaneous radio conference nets with any mix of radio, FXO/FXS, operator and SIP participants. Operator may dial access any conference. If allowed by system administrator, participants may dial access conferences without requiring operator assistance.
POWER	SPECIFICATIONS
Power	Ten to twenty Watts, depending upon FXS lines in use. Connection for AC power brick providing 19-32VDC and external 12-44VDC battery with reverse voltage and fuse protection. Internal auto switching power supply.

APEX 2000 Front Panel

MODEL	DIMENSIONS AND WEIGHT	POWER
Apex 2000	19.0" (483 mm) W x 5.25" (133 mm) H x 10" (354 mm) D, weight 9 lb (4.1Kg.)	19-32 V DC @ 20 Watts

APEX 2000 SYSTEM COMPONENTS	MODEL
Rack-mounted Apex with carry handle; 6 radio audio and control ports, SIP/RoIP gateway; operator panel with dial keyboard, patch panel keyboard, 4x40 character display, PTT handset/headset connector; Monitor speaker; battery charger for internal or external battery	APEX 2000
APEX 2000 OPTIONS	MODEL
VoIP Operator Communications Console	APX-CC
110/230 VAC power pack	APX-ACP
Optional Quad FXO and FXS ports interface card	APX-TC440
Optional PRI T1/E1 interface card	APX-PRI
Noise canceling H-250 handset with PTT control	APX-H250

Specifications Subject to Change without Notice
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US patents 8,442,506 and 9,154,630