InnoMedia BT200 High-Level Product Description & Specifications

V1.1

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BuddyTalk BT200

An intelligent speakerphone and smartspeaker for voice-enabled workplaces

KEY FEATURES and BENEFITS

- Flexible user interface for voice calling
  - **Convenient Call Control** using voice commands, a built-in touch panel, an external tablet controller, or a standard telephone
  - **Multiple voice interfaces** with hands-free speakerphone, and smartphone or POTS-based private mode
- Broad suite of Amazon Alexa™ Voice Service (AVS) smartspeaker features
- Amazon Alexa for Business (A4B) and Phone Call Control (PCC) integration
  - Allowing deployment as a shared voice communication device in conference rooms or on users' desks
  - Managing schedules, to-do lists, meetings and meeting rooms, and dialing into conference calls using voice commands
- Superior voice quality with high-quality wideband codec and advanced acoustic processing for hands-free and private voice communication modes
- Secured communications covering voice commands, call signaling, and voice media
- Cloud-edge computing for flexibility, expandability, and continued value addition

Convenient Call Control

Multiple Voice Interfaces

BT200 Product Overview

Designed for voice-enabled work environments, the BT200 speakerphone offers unprecedented flexibility in calling, ease of use, superior voice quality and high levels of security. Powered by the Amazon Alexa™ Voice Service (AVS), the BT200 is also a smartspeaker supporting a broad suite of AVS enabled features.

Optimized for enterprise users, the BT200 integrates with Amazon Alexa for Business (A4B) and Phone Call Control (PCC) to allow deployment as a shared voice communication device in work environments, and access to Amazon A4B supported enterprise applications and services. With A4B, enterprise users can use voice commands to manage schedules, keep track of to-do lists, manage meetings and meeting rooms, and dial into conference calls.

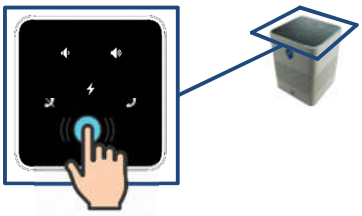
Convenient Call Control

The BT200 offers a variety of methods for users to set up, manage and tear down calls for flexibility and ease of use:

Voice Commands

Utilizing Amazon Alexa™ Voice Service (AVS) speech recognition & natural language understanding technology, the BT200 provides an intelligent voice-dialogue based user interface for call control.

Touch Panel



The device's touch panel can be used to, for instance, adjust call volume and terminate calls.

Smartphone App

An InnoMedia smartphone app can also be used for call control.

POTS-based calling

Traditional POTS-based telephony through the device's FXS port.

Tablet Controller

A companion tablet controller can be used to place and manage phone calls, as well as control the BT200 device.

Figure 1. Convenient Call Control

Multiple Voice Interfaces

During the call itself, the BT200 allows users to employ several different voice communication methods: hands-free speakerphone mode, smartphone-based private voice mode, and POTS-based private mode.

Figure 2. Multiple Voice Interfaces

Superior Voice Quality

The BT200 employs high-quality audio codecs (e.g. Wideband Opus, AMR-WB), advanced acoustic processing (e.g. acoustic echo cancellation, noise reduction, beamforming, de-reverberation, far-field mic pickup etc.), and network impairment handling (e.g. NetEQ™, adaptive jitter buffer, packet loss concealment, etc.) to deliver superior voice quality to its users.

Secured Communications

The BT200 is also highly secured, applying HTTPS and TLS protection over messages and signaling exchanges, and SRTP and ZRTP over voice media.

The BT200 as a Smartspeaker

Certified by Amazon AVS in the category of far-field voice-initiated devices, the BT200 supports a broad range of AVS smartspeaker features such as standard Alexa questions & commands, timers, alarms, reminders, and voice-enabled control of AVS-supported IoT devices.

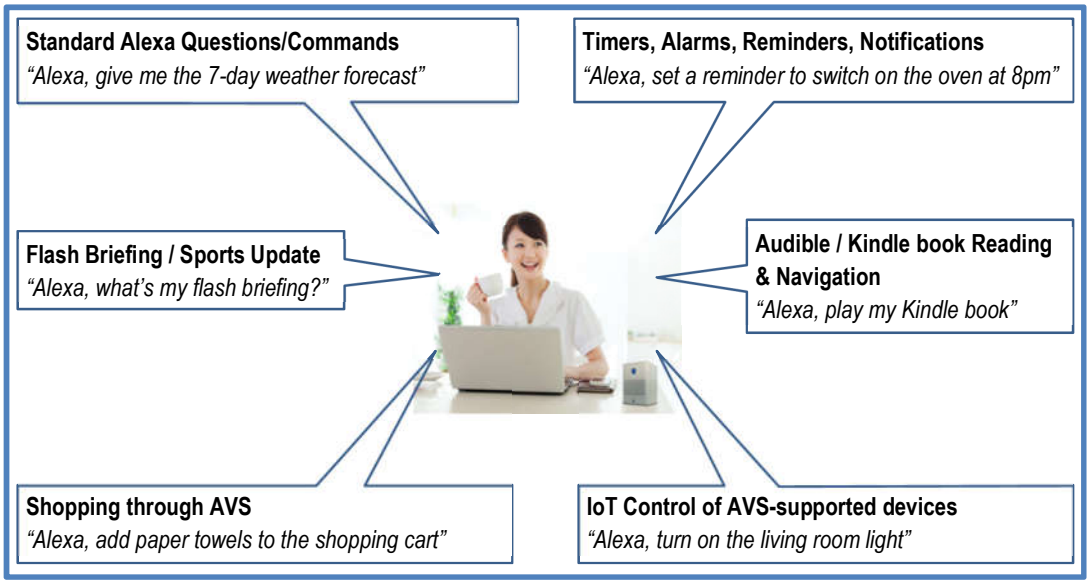


Figure 3. BuddyTalk as a Smartspeaker for Alexa features

The BT200 Voice-Enabled Speakerphone for Enterprise Customers

Building on Amazon AVS, the BT200 further integrates **Alexa for Business** (A4B) and **Phone Call Control** (PCC) to address the needs of enterprise users.

Alexa for Business (A4B)

With the integration of **Alexa for Business**, enterprise users can deploy the BT200 as a device in shared environments around the workplace. It further allows business users to access the enterprise applications and services supported by Amazon A4B. Typical examples of using Alexa for Business to manage business tasks include: setting up shared devices, integrating with existing work calendars, setting up conference rooms and managing conference room features, automatically dialing into conference calls, and accessing custom private skills.

Phone Call Control (PCC)

With the integration of PCC, the BT200 can exchange call state information and callee information with PCC/AVS servers, thus allowing the BT200 to seamlessly initiate and manage the required phone calls based on information retrieved from enterprise applications (e.g., accessing corporate contacts, joining scheduled meetings, starting ad hoc meetings, etc.) using the embedded InnoMedia SIP stack and a configured VoIP service subscription.

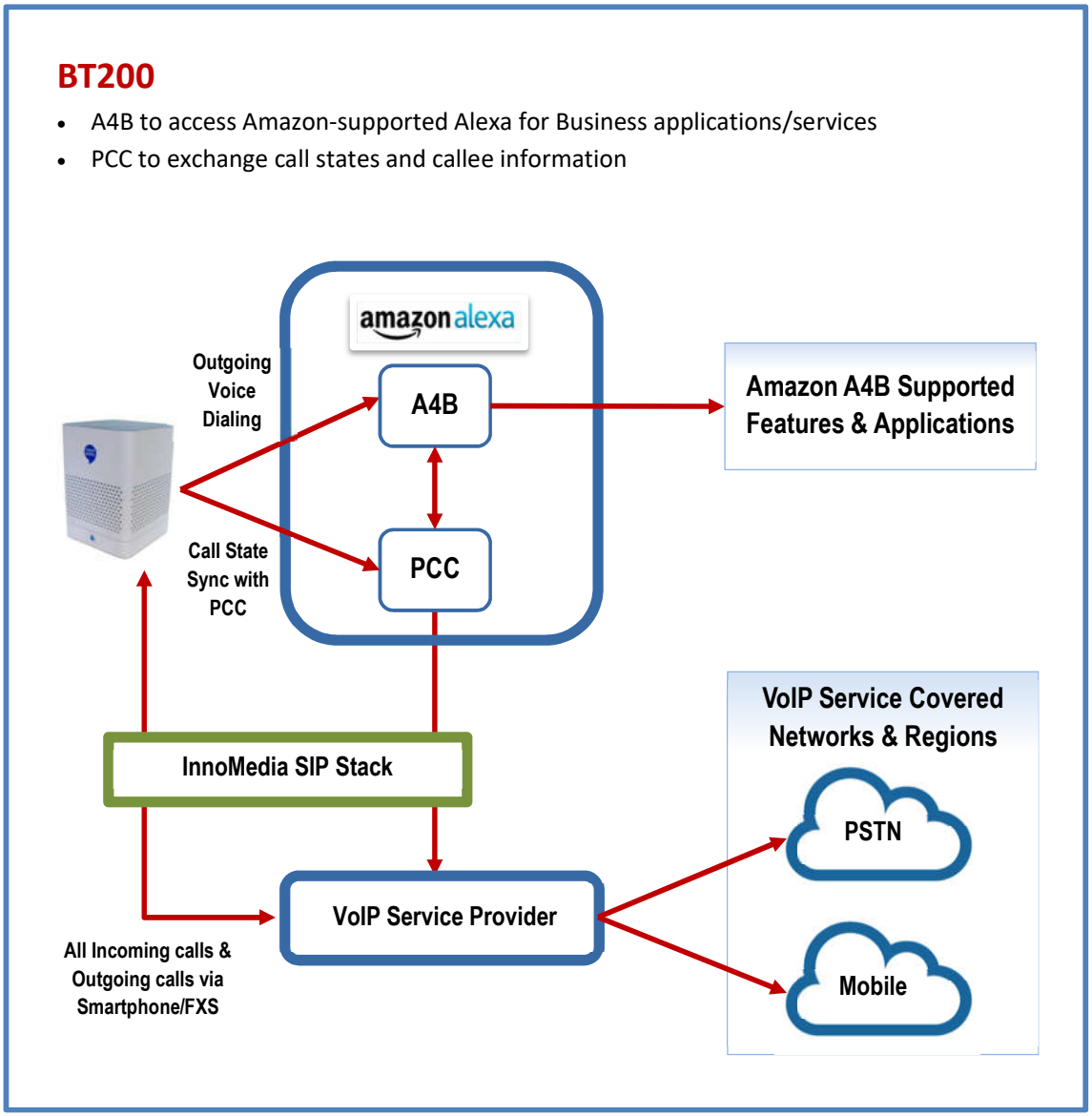


Figure 4. BT200 with A4B and PCC

BT200 Use Case Examples for Enterprise Users

Typical BT200 use cases in the work place include the following:

- Finding information: e.g., the latest sales data, or inventory levels in your warehouse using custom private skills.
- Managing your calendar with Alexa Smart Scheduling Assistant, keeping track of to-do lists, and setting reminders, etc.
- Simplifying meeting room experiences
    - Controlling conferencing systems, checking room availability, and booking rooms
        - "Alexa, join my meeting" triggers the A4B system to find upcoming meetings from the calendar, and connect you to the meeting.
        - A4B supports the use of several industry-standard systems for conference calling.
        - Allows the use of both scheduled and unscheduled meetings with multiple participants.
- Making phone calls by dialing numbers, or selecting contacts from your contact list, dialing into conference calls, etc.

Functional Description

BT200 and Accessories

1. The BT200 Device
2. Hardware and software accessories
    a. BT200 Tablet Controller
    b. BT200 BuddyTalk Smartphone App
    c. BT200 Setup Tool Software (available for download from Microsoft Store)

BT200 Product Functions

- **Amazon AVS-based Smartspeaker**
    - Amazon AVS Certification: Amazon AVS certification in the category of far-field (up to 20ft) voice-initiated devices
    - Amazon Alexa-for-Business (A4B) certification for A4B and Phone Call Control (PCC) integration supporting voice-enabled enterprise applications and services
- **Hands-free Speakerphone**
    - Advanced front-end acoustic audio processing supporting 360º voice pick-up, and up to 20 feet far-field voice-initiated Alexa interactions and hands-free 2-way voice communication
- **Private mode using smartphone app or standard telephone**
    - Smartphone app-based private mode
    - Standard telephone connected to the BT200 FXS port
- **Call control using voice commands, touch panel, smartphone app, and tablet controller**
    - Amazon AVS and A4B based voice call control
    - Built-in touch panel buttons for off-hook, call pickup/hang-up, call mute, flash operations, as well as volume control, cloud mute, and AVS Action Button
    - Smartphone app with remote touch panel operation and status display, and dial pad for call control and dialling
    - Tablet Controller with GUI for call control, call status display, and configuration of device and tablet settings
- **VoIP Call features and capabilities**
    - SIP 2.0 VoIP with UDP, TCP, and TCP with TLS based signaling
    - Codecs:
        - Narrow-band: G.711 (μ-law and A-law), G.729, iLBC, Narrowband Opus
        - Wideband: G.722, Wideband Opus, and AMR-WB
    - Network impairment handling with adaptive jitter buffer, NetEQ™, packet loss concealment
    - Call features: 3-way calling, call transfer, call forwarding, call waiting
    - A4B and PCC integration for conferencing and room booking management
- **Secured connections, provisioning, and voice communications**
    - Communications
        - TLS1.2 with certificate validation
        - HTTPS connections to all external web servers

        - Certificate validation includes:
            - SAN
            - Date/timestamp check for expiration
            - Certificate revocation check using OCSP
    - Over-The-Air (OTA) Provisioning
        - HTTPS secured provisioning for configuration file and image download
        - Encrypted configuration file
        - Encrypted and signed executable image
    - Device hardening with device-dependent password (no common default password)
    - VoIP
        - TLS-based secured signalling
        - RTP/RTCP media security with SRTP/ZRTP
- **Built-in VPN for enterprise network traversal**
    - Configurable traffic routing for traversal of VoIP signalling and media, or all traffic

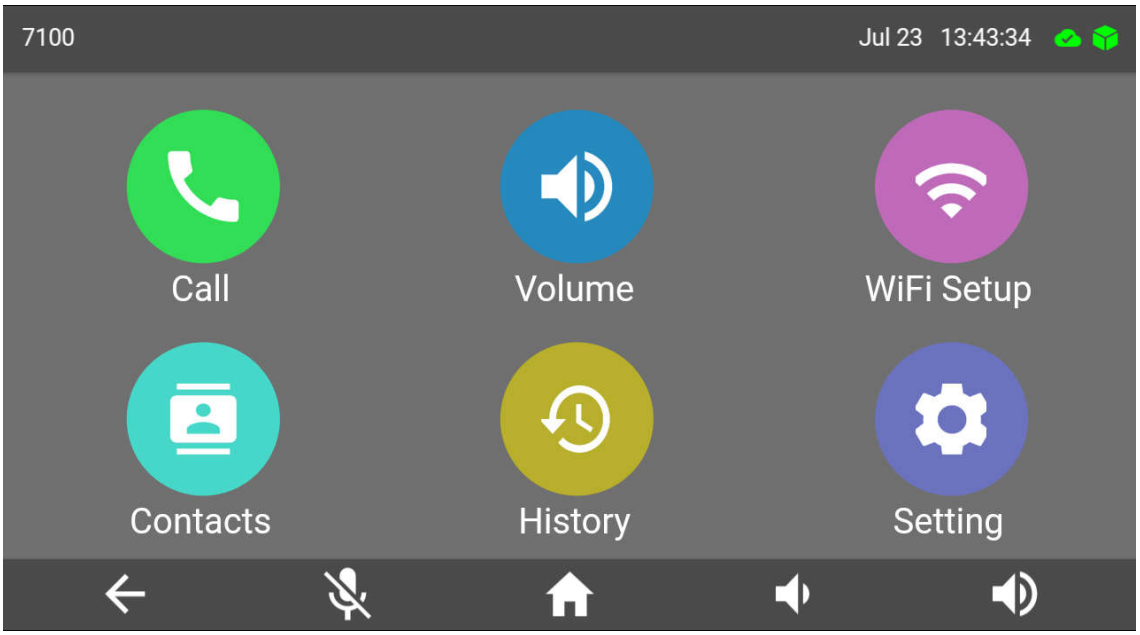
BT200 Tablet Controller

The BT200 Tablet Controller employs a call status indicative and icon-based GUI to allow users to manage both phone calls and the BT200 device itself. With these GUI interfaces, the user can use the Tablet Controller to:

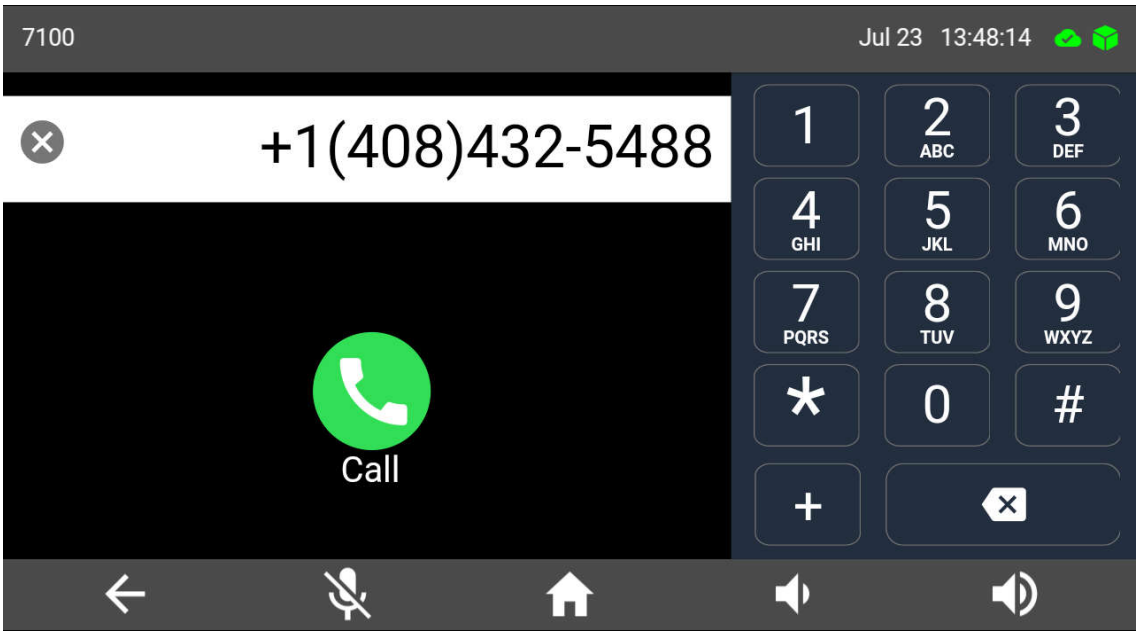
- Configure the BT200 device (e.g., Binding the Tablet Controller to the BT200 device, enabling/disabling Alexa Start of Request and End of request sounds, and granting the BuddyTalk App on the users' smartphone access rights to the BT200 device)
- See the current state of the device (e.g. on a call)
- Control the BT200 device (e.g. set the volume, cloud mute, etc.)
- Initiate calls (through the user contacts, call history, redial, or dialing a new number using the dial pad), answer calls, or reject calls.

The following screenshots provide an overview of some of the major operations possible with the tablet controller.

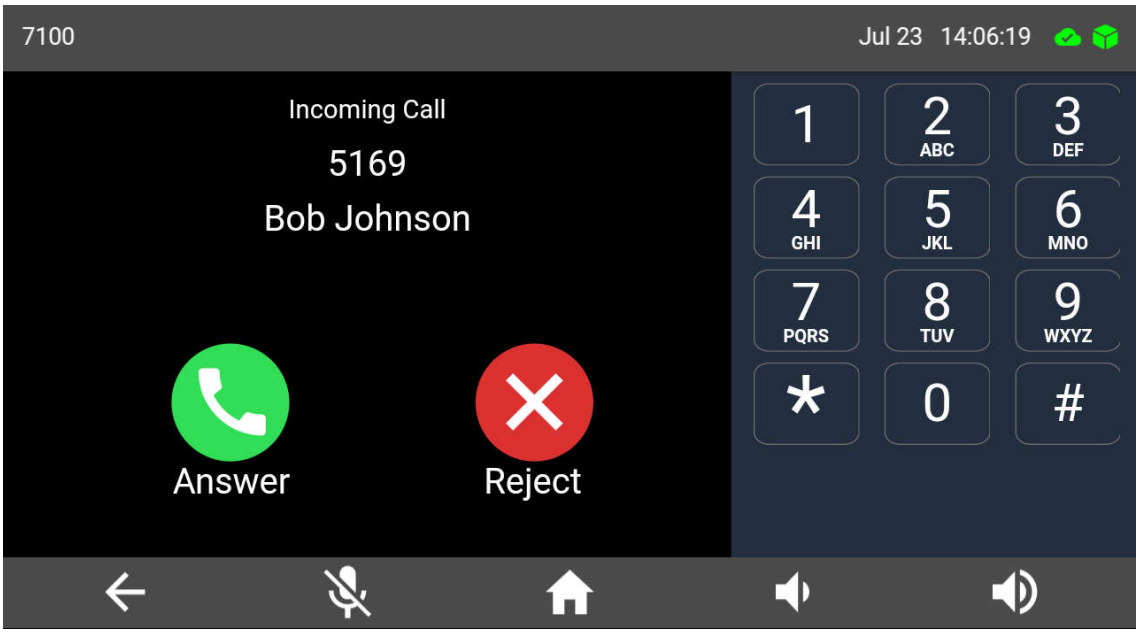
Home Page



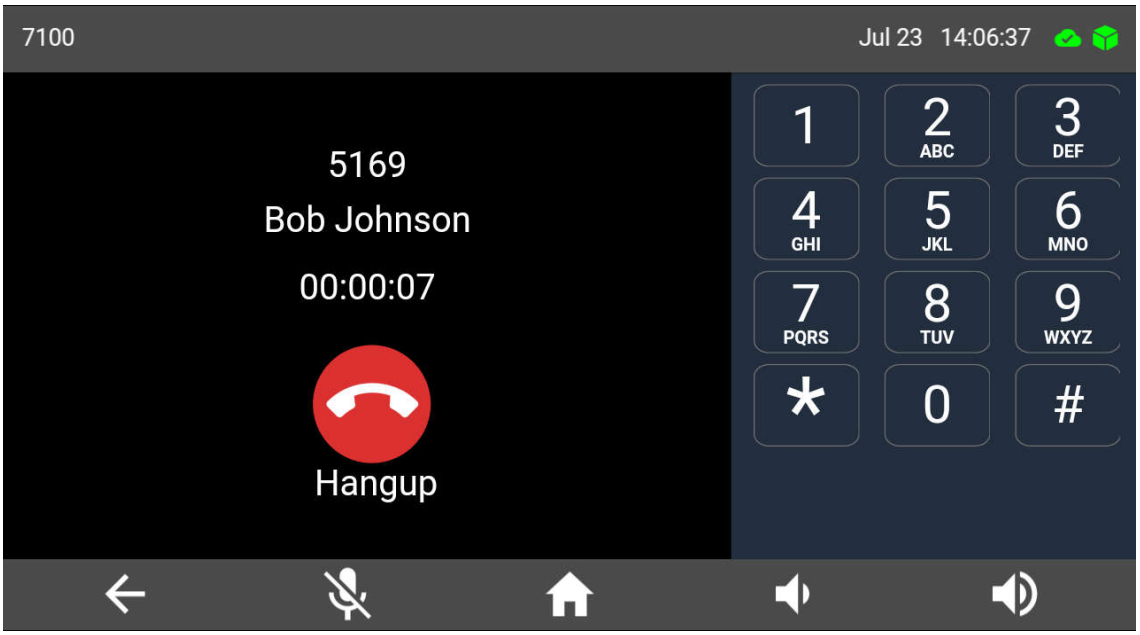
Outgoing Call Initiation



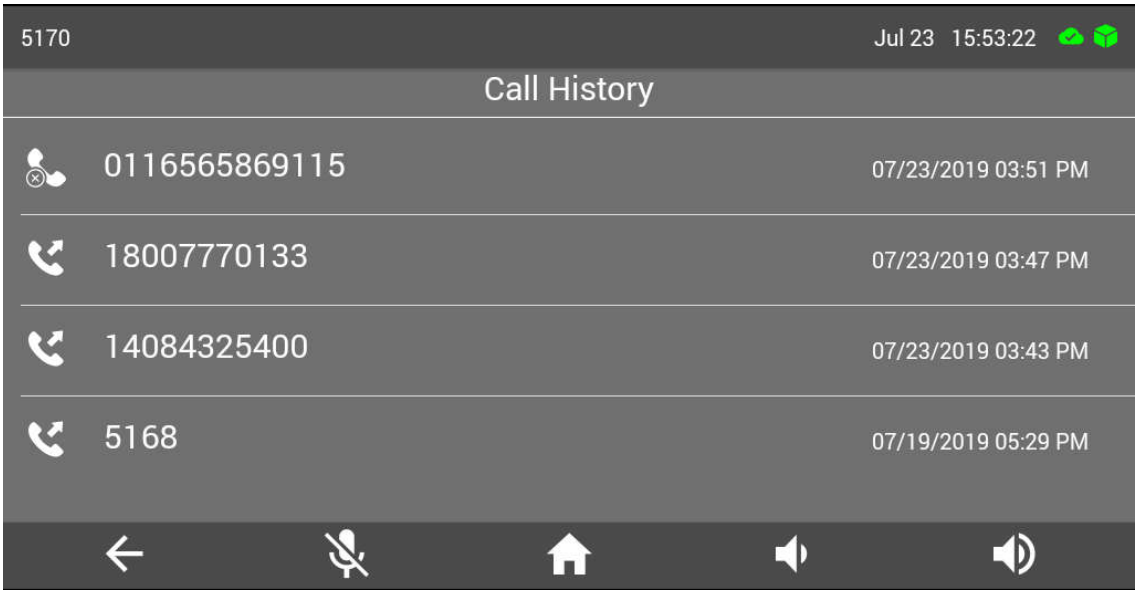
Incoming Call Received



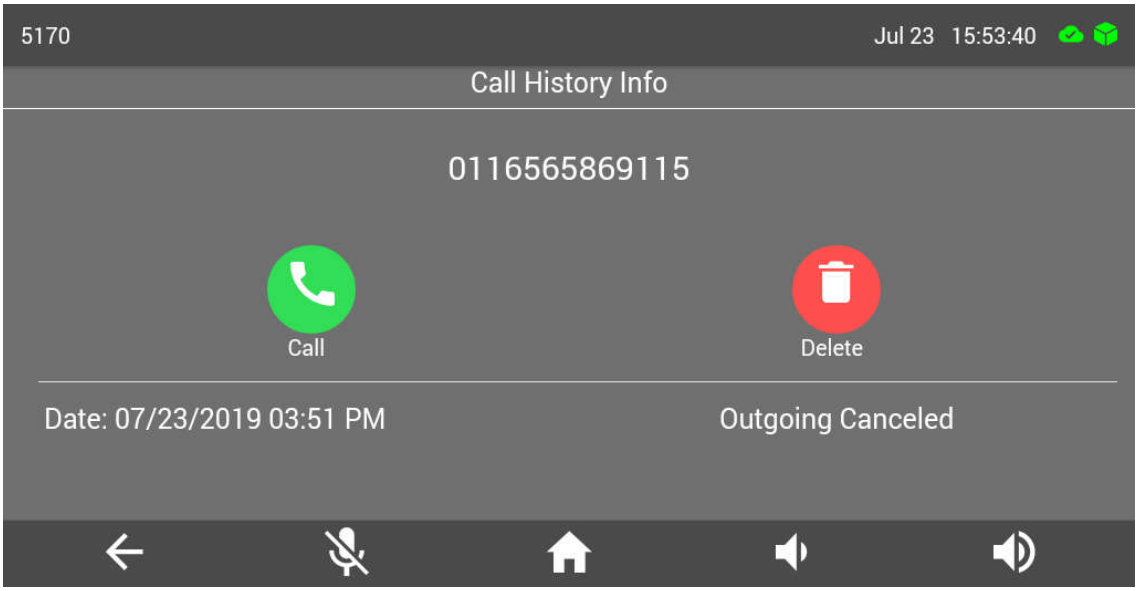
Active Call Page



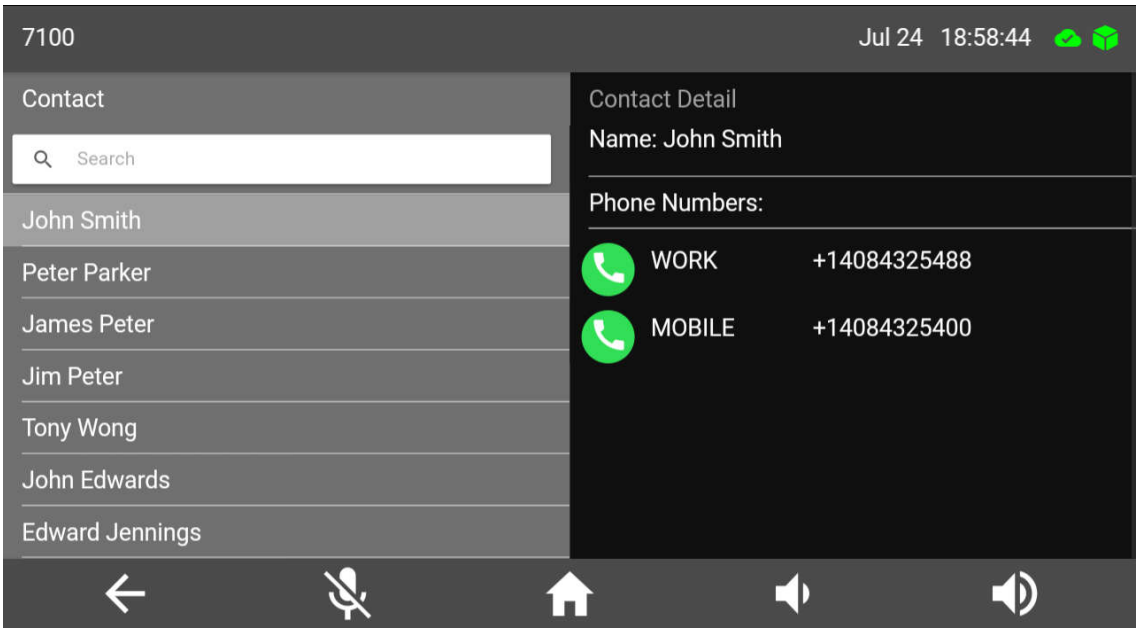
Call History



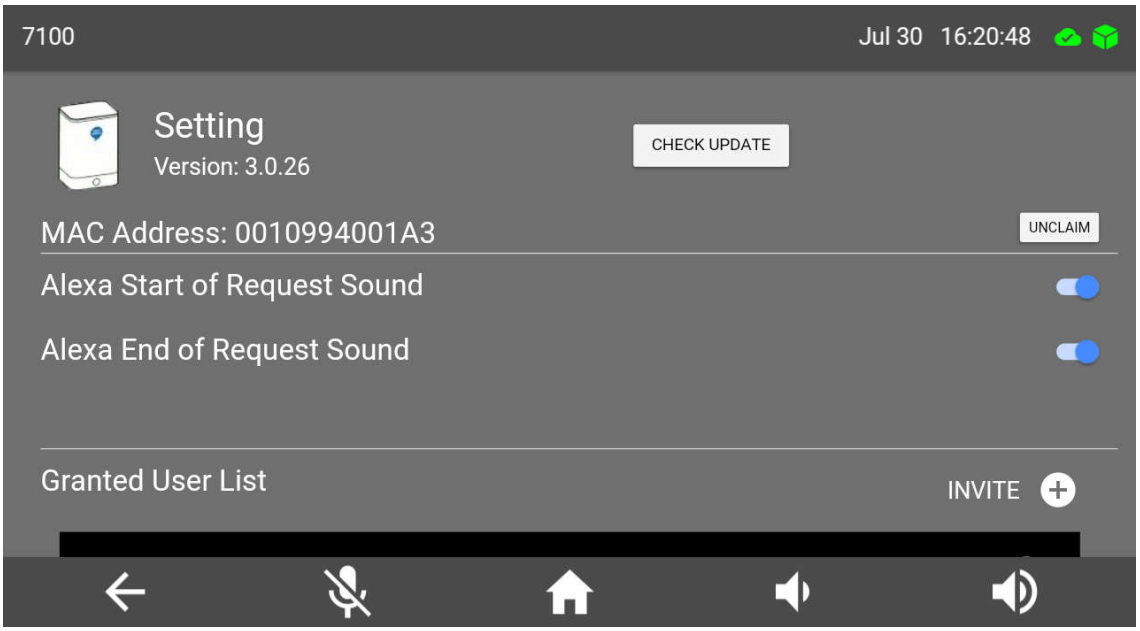
Call History Based Outgoing Call Initiation



Contacts and Contacts-based Outgoing Call Initiation



Settings Page

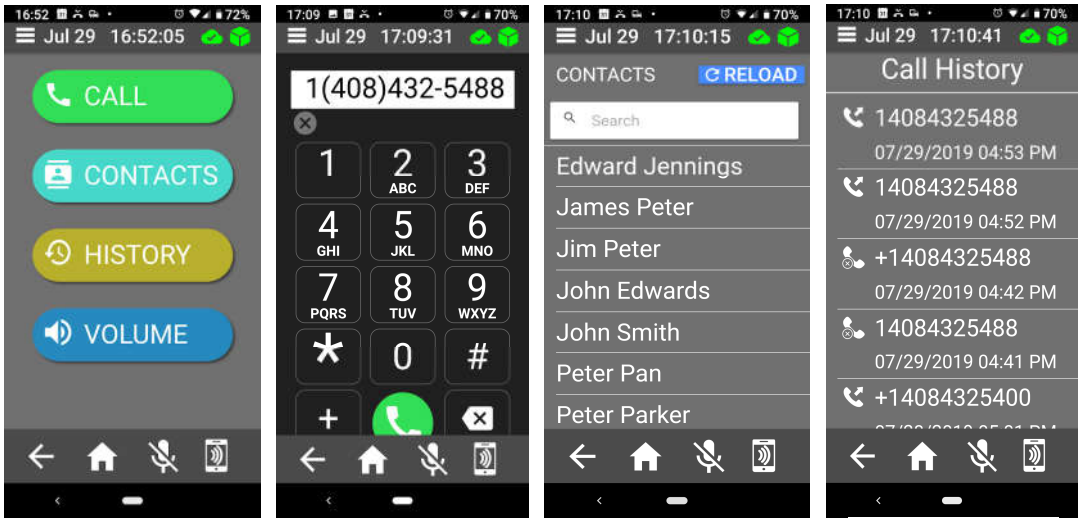


Setup Page

Smartphone BT200 BuddyTalk App

In addition to the Tablet Controller, InnoMedia also offer the BT200 BuddyTalk companion smartphone app. Once granted access rights, the BuddyTalk app allows users to control the BuddyTalk BT200 device and conduct voice communications using private mode from their own smartphones. The BuddyTalk App employs similar icon-based GUI pages as those used in the BuddyTalk Tablet Controller. With these GUI interfaces, the user can:

- See the current state of the device is (e.g. on a call)
- Control the BT200 device (e.g. set the volume, cloud mute, etc.)
- Initiate calls (through the user contacts, call history, redial, or dialing a new number using the dial pad), answer calls, or reject calls.
- Switch the BT200 into **Private Mode**, such that the user can issue Alexa commands for both AVS and A4B activities, make calls, receive calls, and talk using his/her smartphone as a voice input/output device (instead of the BT200 mic/speaker) for full privacy and ease of use. As the call is still placed through the VoIP service (and its phone number) enabled on the BT200 device, Private Mode seamlessly extends the user's VoIP service wirelessly to the user's WiFi coverage area whenever the smartphone is connected to the same local area network as that of the BT200.



Main Page | Dialpad | Contacts | History

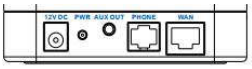
BT200 Setup App: See BT200 Setup App User Manual

Product Specifications

BT-100 Buttons and Connectors

Setup button, front view

Reset pinhole, USB connector, left view



Power, Aux Out, Phone, and WAN connectors, back view

BT-100 LED and Touch Panel

Ring LED	State description	Ring LED	State description
	Not lit. Idle state and Ready to accept voice commands.		Cloud mute (mute Alexa interactions)(red)
	Purple. Do not disturb on. Single flash on voice interactions.		Yellow. AVS notifications pending.
	Blue-Cyan. • AVS thinking state. Alternating colors at 620 ms • AVS speaking state. Alternating colors at 1260 ms		Yellow-Red AVS notification pending and Cloud mute (mute Alexa interactions).
	Cyan. AVS listening state.		Orange. • Spinning clockwise. While connecting to the Internet during initialization. • Fading blinking. Fail to connect to Internet, or system error.

icon	State description	icon	State description
	Phone. Not-lit. Idle. Tap to make a call.		Phone. Green. [Ongoing call|Ringing] mode. No voice mail.
	Phone. Yellow. Voice mails and registered.		Phone. Red [BuddyTalk not setup| Not registered] mode
	Unmute. Not lit. Tap to mute call.		Mute. Red. [BuddyTalk not setup|Call Mute] mode. Tap to unmute.
	Flash key. Not lit. Tap to merge calls, transfer a call, call waiting …		Flash. Green when tapped.
	Buddytalk not setup. Red.		
	Volume down. Not lit. Tap to lower volume		When device speaker is muted. Red.
	Volume up. Not Lit. Tap to increase volume		When device speaker is muted. Red.
	MIC. Not lit. Unmute. Tap to cloud mute.		Cloud mute (mute Alexa interactions). Red. Tap to unmute.
	Press for 3 seconds. Green. AVS Action Button.		

External Interface Specifications

Category	Specifications
Telephone Interface	1 FXS voice port
Ethernet Network Interface	1 RJ45 Ethernet 10/100 BaseT WAN port
WiFi Interface	IEEE 802.11 a/b/g/n/ac client* Dual band 2.4/5 GHz with built-in antenna
USB Interface	1x USB2.0 Type A port
Bluetooth	Bluetooth 4.0
Accessories	Ethernet cable, phone cable, AC/DC power adapter

* WiFi operates only in client mode during normal operation. WiFi can operate in server (captive portal) mode for device discovery by the Setup Tool during the setup phase.

Audio I/O Specifications

Category		Specifications
Microphones	Placement	3 mics in equilateral triangular array, 360° pickup
	Audio pickup range	ASR mode: up to 20 feet (far-field)
		2-way audio mode: 10 feet
Speaker	Frequency response	± 10dB in 100 – 20,000 Hz
	SPL (1.0Watt/0.5m)	84 ± 3 dB at 0.8K, 1.0K, 1.2K, 1.5KHz

Hands-Free Mode Acoustic/Audio Signal Processing

Category		Applied Audio Processing
ASR Mode	Local Wake Word Detection (WWD)	• Linear Acoustic Echo Cancellation • Beamformer • Automatic Noise Reduction • De-reverberation • Compander + Limiter
	Cloud Wake Word Verification (WWV) and AVS NLU	• Linear Acoustic Echo Cancellation • Beamformer
2-Way Audio Mode	VoIP	• Linear Acoustic Echo Cancellation Beamformer • Automatic Noise Reduction • Nonlinear Acoustic Echo Cancellation • Nonlinear Processing • Comfort Noise Insertion • De-reverberation • Compander + Limiter
	Local and Cloud WWD/WWV & NLU	• Linear Acoustic Echo Cancellation

FXS Port Signal Processing

Category	Specifications
FXS Signal Processing	• Echo cancellation: G.168 • Caller ID FSK signal regeneration • Attenuation and gain adjustment • Comfort noise generation (CNG) • Visual messaging waiting indicator (VMWI) • Voice activity detection (VAD) • Hook flash event signaling

Software Specifications: Telephony

Category	Specifications
Signaling Protocol	SIP 2.0
SIP Proxy Redundancy	Dynamic through use of NAPTR, DNS SRV, A records
Speech Codec Capabilities	G.711, G.729, G.722, iLBC, Opus (Narrowband/Wideband), AMR-WB
Network Impairment Handling	• Packet loss concealment • Jitter buffer: adaptive, fixed • Advanced media processing with NetEQ™
Voice Features	• Configurable dialing plans (digitmap) with interdigit and critical timers • Caller ID blocking, call waiting, call transfer, do not disturb (DND), 3-way conferencing with local mixing, anonymous call rejection • Caller ID generation: FSK • Speed dialing • E911 support • Reject anonymous call • Multiple service profiles
DTMF Tone and IVR	• DTMF tone detection and generation: RFC2833 and in-band • IVR in multiple languages (English and Spanish): Plays out any voice stream sent by a SIP Proxy controlled announcement server as well as pre-stored announcements for (1) Device IP (2) Internet cable not connected (3) Internet service down (4) Device not registered with service provider
Tones	• Ring back tone • Off hook warning tone • Message waiting tone • Reorder tone • Busy tone • Dial tone • Call waiting tones (multiple) • Confirmation tone • Multiple country support: – CID Type – Tone cadence – Ring cadence (Five) – Ring Splash – Line Impedance
SIP Capabilities	SIP INFO for DTMF/Flash Event SIP NOTIFY SIP PING SIP PRACK

GR-909 Line Tests	FEMF/HAZ – Foreign line voltage detection ROH Tests – Receiver off-hook detection REN Test – REN range violation detection Resistive Faults Test – Tip-to-Ring short detection

Software Specifications: Networking

Category	Specifications
IP and data networking	DNS: NAPTR, SRV record, A record Dynamic host configuration protocol (DHCP) client, or fixed IP ICMP, TCP, UDP, TLS (SIP transport protocol) RTP, RTCP (media protocol) SNTP (simple network time protocol)
QoS	Voice packet prioritization over other packet types. TOS settings for: • VoIP SIP signaling • Voice media traffic • Host data traffic
Wireless Security	WPA & WPA2 (WiFi Protected Access)
VPN	Enterprise network traversal with configurable traffic routing: 1. VoIP signalling and media 2. All traffic

Software Specifications: Security

Category	Specifications
Message exchanges and connections to external web servers	TLS v1.2 with certificate validation HTTPS with certificate validation Certificate validation includes: • SAN • Date/time check for expiration • Certificate revocation check using OCSP
Over-The-Air (OTA) provisioning	• HTTPS secured provisioning for configuration file and image download • Encrypted configuration file • Encrypted and signed executable image
VoIP	• TLS for signaling • SRTP/ZRTP for media security

Software Specifications: OAM&P

Category	Specifications
Voice quality monitor	Voice quality statistics: RTCP/RTCP-XR reports End of call MOS score reporting
Remote Access	Management consoles: WEB (HTTP, HTTPS), SSH, Telnet Protocols: SNMP v1 and v2c, syslog InnoMedia EMS (Element Management System) support SIP packet and media loopback features
Dynamic Provisioning and Secured Software Upgrade	• Automated provisioning with in-service configuration update and software upgrade using HTTPS, HTTP, FTP, TFTP • Asynchronous server-initiated provisioning using SIP NOTIFY

Approvals

Category	Specifications
Approvals	• Amazon AVS certification for the far-field (up to 20ft) voice-initiated device category • Amazon Alexa-for-Business (A4B) Certification

Regulatory Compliance

Category	Specifications
Certifications/Compliance	• FCC part 15B Class A • UL • RoHS compliant

Hardware and Environmental Specifications

Category	Specifications
Subscriber Line Interface Circuit (SLIC)	Maximum ringer load: 3 ringer equivalence numbers (RENs), 25mA loop current, 65V_{rms} ring voltage
Power Consumption	Idle: 2.784W / Ringing: 6.72W / Talking: 3.66W / Talking on FXS port: 4.38W
Power Adapter	Output: DC 12V, 2A / Input: AC 120V~240V, 50~60Hz, 600mA
Dimensions	W x L x H: 105mm x 105mm x 147.25mm
Weight	0.79 kg (1.74 lb)/ Whole Packaging: 1.31 kg (2.88 lb)
Operating Temperature	32ºF to 104ºF (0ºC to 40ºC)
Storage Temperature	-4ºF to 158ºF (-20ºC to 70ºC)
Operating Humidity	10 to 90% RH
Storage Humidity	5 to 95% RH

Tablet Controller Specifications

Category	Specifications
Screen	10.1 inches IPS , 1280*800 Capacitive five point touch screen
Battery	Polymer battery. Capacity: 3.7V 6000 mAH
Size	L x W x T: 291*265.5*7.8mm
Weight	3kg
External interfaces	WiFi, Bluetooth, 1 x Micro USB, 1 x TF Card Slot, 2 x SIM Card Slot, 1 x Earphone Jack

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