Cisco Unified Communications 500 Series Model 540 for Small Business

Reference Guide

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Product Overview

The Cisco® Unified Communications 540 (Figure 1) part of the Cisco Unified Communications 500 Series for Small Business, is a critical part of the Cisco Smart Business Communications System. It is an affordable unified communications appliance that provides voice, data, voicemail, automated attendant, video, security, and wireless capabilities while integrating with existing desktop applications such as calendar, email, and customer relationship management (CRM) programs. This easy-to-manage platform supports up to 32 phones and voice mailboxes and provides flexible deployment options based on your needs, including support for a wide array of IP phones, public switched telephone network (PSTN) interfaces, and Internet connectivity. This reference guide describes the specifications and capabilities of the Cisco Unified Communications 540 (UC 540).

Figure 1. Cisco Unified Communications 540 Models: FXO (Left) and BRI (Right)

Product Part Numbers

The Cisco UC 540 is available in two versions, an FXO (analog) model and a Basic Rate Interface (BRI) base model. With ease of ordering as a focus area, each has its own product ID. In addition, there is one software licensing product, multiples of which can be installed to achieve the desired user count. Table 1 lists the part numbers for the Cisco UC 540.

Table 1. Product Part Numbers for the Cisco UC 540

Part Number	Description
UC540W-FXO-K9	UC 540 system with 4 FXO, 4 FXS, and 1 voice interface card (VIC) expansion slot
UC540W-BRI-K9	UC 540 system with 2 BRI, 4 FXS, and 1 VIC expansion slot
L-UC-PRO-8U=	Software license upgrade, authorizing an additional 8 users (eDelivery)

Interfaces and Modules

The Cisco UC 540 has built-in interfaces that offer fixed configurations, reducing complexity. In addition, this platform offers one (1) voice interface card (VIC) slot to support additional Cisco VIC modules. Table 2 lists the built-in interfaces, and Table 3 lists the modular interfaces supported on the UC 540.

Table 2. Built-In Interfaces Supported on the Cisco UC 540

Interface	Description
Music-on-hold port	Single 3.5-mm audio port
Onboard Ethernet ports	• Eight 10/100 Mbps LAN • One 10/100 WAN uplink • One 10/100 Ethernet expansion port
Integrated inline Power over Ethernet (PoE) ports	8 built-in PoE ports

Interface	Description
FXS and direct inward dialing (DID) ports	4 built-in FXS ports (DID is available via the additional module listed in Table 3)
PSTN interfaces (FXO or BRI)	4 FXO or 2 BRI ports
WLAN interface	An 802.11b/g access point is integrated into the UC 540, supporting up to 54-Mbps connections. The access point can be used to provide integrated WLAN connectivity to mobile clients - voice and data - resulting in mobility and enhanced productivity for users.

Table 3. Modular VIC Cards for the Cisco UC 540

Part Number	Description
VIC-4FXS/DID, VIC3-4FXS/DID	4-port FXS/DID module
VIC2-2FXS	2-port FXS module
VIC2-2FXO	2-port FXO module
VIC3-2FXS/DID	2-port FXS/DID module
VIC2-4FXO	4-port FXO module
VIC2-2BRI-NT/TE	2-port BRI NT/TE module
VWIC2-1MFT-T1/E1	1-port T1/E1 for voice (ISDN Primary Rate Interface [PRI] and channel associated signaling [CAS]); data is not supported

Licensing

The Cisco UC 540 includes 24 user licenses. These licenses enable the use of Cisco Unified IP Phones and allow users to access the IP PBX features, including voicemail. In addition, supplementary user licenses are bundled to help with deployments that need a few extra licenses. For additional licensing needs, the L-UC-PRO-8U= may be ordered. This increases the existing license count by eight. Table 5 lists the number of users supported based on the hardware/license configurations. The UC 540 also has built-in licenses for unified communications features. Table 4 lists the license count bundled within the system for each feature. Guidance for licenses associated with voice messaging on the UC 540 is included in Table 6.

Note: Among the 24 base licenses provided 16 of them are provided as supplemental licenses.

Table 4. Licensing and User Capacity for the Cisco UC 540

License Configuration	Description
UC540W-FXO-K9 or UC540W-BRI-K9	24 user licenses, 6 supplemental user licenses
UC540W-FXO-K9 or UC540W-BRI-K9 and one L-UC-PRO-8U=	32 user licenses, 8 supplemental user licenses

Table 5. Feature Licensing for the Cisco UC 540

Feature	Number of Licenses Included
Virtual LANs (VLANs)	5
Service Set Identifiers (SSIDs)	3
Broadcast SSIDs (BSSIDs)	1
VPN tunnels*	10
Remote teleworker sites	10
Users per teleworker site	5
Multisite deployments	5

* Includes IP security (IPSec), Secure Sockets Layer (SSL), or generic routing encapsulation (GRE) tunnels.

Table 6. Voice Messaging Licensing for the Cisco UC 540

Configuration	Voice Messaging Licenses
24-user system	65 mailboxes*
32-user system	65 mailboxes*
Sessions to voicemail and automated attendant	6
Internet Message Access Protocol (IMAP) sessions	20**

* 32 hours of voicemail storage is available by default across all user configurations. Any combination of personal mailboxes and general delivery mailboxes can be used.
** There are 20 simultaneous sessions available between IMAP Client and IMAP server. If all 20 sessions are used up, the remaining session requests will be rejected by the IMAP server. IMAP clients will automatically attempt to establish session with the server once some of the server ports are freed up. This does not limit the number of IMAP clients to 20.

Basic Call Center Capabilities

The Cisco UC 540 supports basic automatic call distribution (BACD) that can help answer outside calls with greetings and menus and allow callers to select the appropriate departments. BACD also provides managed call queues for calls that are waiting to be answered. Table 7 lists the BACD capabilities of the UC 540.

Table 7. Cisco UC 540 BACD Capabilities

Feature	Number
Hunt groups associated with a BACD	10
Calls allowed in each call queue	30
Agents (members) for each hunt group	20
Statistics accumulated for all BACD groups	168 hours
Hunt groups used with automated attendant	3

In addition to BACD, the Cisco UC 540 integrates with Cisco Unified Contact Center Express (UCCX). UCCX works with up to a maximum of 12 users (agents and supervisor combined) on the UC 540.

Voice Resource Utilization

The Cisco UC 540 includes four digital signal processors (DSPs) that enable digitized voice processing on the platform. The DSP resources available on the platform are used for various unified communications features, namely support of analog and digital VICs, prescheduled or ad hoc voice conference calls, and translation of digitized voice from a less complex codec (such as g711) to a more complex codec (such as g729) - typically used for deployments that use IP trunking (SIP or H.323) for PSTN access or multisite interconnection.

Each DSP can support 16 g711 channels or 8 g729 channels. This enables a total of 64 g711 channels on the Cisco UC 540. Table 8 indicates the DSP resource utilization based on the feature. Tables 9 and 10 show a few deployment scenarios based on the combination of these features.

Table 8. DSP Resource Utilization on the Cisco UC 540

Feature	DSP Resource Utilization
Support for built-in FXS ports	4 channels
Support for built-in FXO ports	4 channels
Support for built-in music on hold (MoH) port	2 channels

Feature	DSP Resource Utilization
Support for T1/E1 voice/WAN interface card (VWIC)	24 channels*
Transcoding (g711 to g729)	2 channels
Conferencing**	16 channels

* Total DSP resources will depend upon the number of channels provisioned in the T1.
** Conferencing always uses up an entire DSP. The rest of the features can share a DSP. The number of sessions available will vary depending upon the codec used in a conference call.

Tables 9 and 10 list maximum sessions for either ad hoc conferencing or meet-me conferencing. DSP resources allocated for conferencing can be shared by both features, and a mix of these can be configured. Below are a few examples based on Table 9. The concept of sharing conferencing resources applies to Table 10 as well.

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Ad hoc 24x8      Meet-me 0x0
Ad hoc 12x8      Meet-me 12x8
Ad hoc 24x4      Meet-me 6x16
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The above examples indicate Sessions x participant.

The Transcoding column lists the maximum transcoding sessions that the system can be configured for, for a given configuration of DSP. For example, the first row in Table 9 indicates that a maximum of three transcoding sessions are available if three DSPs are allocated for conferencing.

If more transcoding sessions are required, DSP resources will need to be diverted from conferencing to transcoding. For example, in the second row of Table 9, one of the DSPs is dedicated to transcoding, leaving two DSPs for conferencing. Notice the increase in the number of transcoding sessions and the drop in the number of conferencing sessions.

Table 9. DSP Resources: Scenario 1

UC 500 Model	Additional Voice Card (VIC)	SIP Trunk Preferred Codec	Ad-hoc Conference (Sessions x Participants)	Meet-me Conference (Sessions x Participants)	Comments	Transcoding
UC 540	None	No SIP Trunk or G.711	Up to a maximum of 24x8 or 48x4	Up to a maximum of 24x8 or 12x16 or 6x32	• 1 DSP for supporting voice ports and Transcoding sessions • Remaining 3 DSPs used for Conferencing	A maximum of 3 Transcoding sessions for this configuration
		G.729 Transcoding sessions recommended	Up to a maximum of 4x8 or 8x4	Up to a maximum of 4x8 or 2x16 or 1x32	• 1 DSP for supporting voice ports and Transcoding sessions • 1 DSP reserved for transcoding • Remaining 2 DSPs used for Conferencing	A maximum of 11 Transcoding sessions for this configuration
	2FXS 2FXS/DID 2FXO	No SIP Trunk or G.711	Up to a maximum of 24x8 or 48x4	Up to a maximum of 24x8 or 12x16 or 6x32	• 1 DSP for supporting voice ports and Transcoding sessions • Remaining 3 DSPs used for Conferencing	A maximum of 2 Transcoding sessions for this configuration
		G.729 Transcoding sessions recommended	Up to a maximum of 4x8 or 8x4	Up to a maximum of 4x8 or 2x16 or 1x32	• 1 DSP for supporting voice ports and Transcoding sessions • 1 DSP reserved for transcoding • Remaining 2 DSPs used for Conferencing	A maximum of 10 Transcoding sessions for this configuration
	4FXS 4FXS/DID 4FXO 2BRI NT/TE	No SIP Trunk or G.711	Up to a maximum of 24x8 or 48x4	Up to a maximum of 24x8 or 12x16 or 6x32	• 1 DSP for supporting voice ports and Transcoding sessions • Remaining 3 DSPs used for Conferencing	A maximum of 1 Transcoding sessions for this configuration
		G.729 Transcoding sessions recommended	Up to a maximum of 4x8 or 8x4	Up to a maximum of 4x8 or 2x16 or 1x32	• 1 DSP for supporting voice ports and Transcoding sessions • 1 DSP reserved for transcoding • Remaining 2 DSPs used for Conferencing	A maximum of 9 Transcoding sessions for this configuration

Table 10. DSP Resources: Scenario 2

UC 500 Model	Additional Voice Card (VIC)	SIP Trunk Preferred Codec	Ad-hoc Conference (Sessions x Participants)	Meet-me Conference (Sessions x Participants)	Comments	Transcoding
UC 540	1MFT T1/E1 No. of Ch ≤ 6	No SIP Trunk of G.711	Up to a maximum of 24x8 or 48x4	Up to a maximum of 24x8 or 12x16 or 6x32	• 1 DSP for supporting voice ports fractional T1/E1 and Transcoding sessions • Remaining 3 DSPs used for Conferencing	0 session for 6 ch 1 session for 4 ch 2 sessions for 2 ch
		G.729 Transcoding sessions recommended	Up to a maximum of 4x8 or 8x4	Up to a maximum of 4x8 or 2x16 or 1x32	• 1 DSP for supporting voice ports fractional T1/E1 and Transcoding sessions • 1 DSP reserved for transcoding • Remaining 2 DSPs used for Conferencing	8 session for 6 ch 9 session for 4 ch 10 sessions for 2 ch
	1MFT T1/E1 6 ≤ No. of Ch ≤ 22	No SIP Trunk or G.711	Up to a maximum of 16x8 or 32x4	Up to a maximum of 16x8 or 8x16 or 4x32	• 2 DSP for supporting voice ports and Transcoding sessions • Remaining 2 DSPs used for Conferencing	0 session for 22 ch 1 session for 20 ch 2 sessions for 18 ch And so on…
		G.729 Transcoding sessions recommended	Up to a maximum of 2x8 or 4x4	Up to a maximum of 2x8 or 1x16	• 2 DSP for supporting voice ports and Transcoding sessions • 1 DSP reserved for transcoding • Remaining 1 DSPs used for Conferencing	8 session for 22 ch 9 session for 20 ch 10 sessions for 18 ch And so on…
	1MFT Full T1	No SIP Trunk or G.711	Up to a maximum of 8x8 or 16x4	Up to a maximum of 8x8 or 4x16 or 1x32	• 3 DSP for supporting voice ports and Transcoding sessions • Remaining 1 DSPs used for Conferencing	A maximum of 7 Transcoding sessions, disable Conferencing for more transcoding
		G.729 Transcoding sessions recommended	Up to a maximum of 2x8 or 4x4	Up to a maximum of 2x8 or 1x16	• 3 DSP for supporting voice ports and Transcoding sessions • 0 DSP reserved for transcoding • Remaining 1 DSPs used for Conferencing	A maximum of 7 Transcoding sessions, disable Conferencing for more transcoding
	1MFT Full T1	No SIP Trunk or G.711	Up to a maximum of 8x8 or 16x4	Up to a maximum of 8x8 or 4x16 or 1x32	• 3 DSP for supporting voice ports and Transcoding sessions • Remaining 1 DSPs used for Conferencing	A maximum of 4 Transcoding sessions, disable Conferencing for more transcoding
		G.729 Transcoding sessions recommended	Up to a maximum of 2x8 or 4x4	Up to a maximum of 2x8 or 1x16	• 3 DSP for supporting voice ports and Transcoding sessions • 0 DSP reserved for transcoding • Remaining 1 DSPs used for Conferencing	A maximum of 4 Transcoding sessions, disable Conferencing for more transcoding

Localization

Cisco UC 500 series is enabled with localization for IP Phones, Voicemail and Dial Plan. Table 11 summarizes the localization support on the platform.

Table 11. Localization support on UC 500 Series

Language	79xx[a] Series IP Phones	SPA 5xx[b] Series IP Phones	Voicemail
Bulgarian	✓		
Chinese (China)	✓		
Chinese (Taiwan)	✓		
Danish	✓	✓	✓
Dutch	✓	✓	
English (US)	✓	✓	✓
English (UK)	✓	✓	✓
Finnish	✓	✓	
French (Canadian)	✓	✓	✓
French (European)	✓	✓	✓
German	✓	✓	✓
Hungarian	✓		
Italian	✓	✓	✓
Japanese[c]	✓	✓	
Korean	✓		
Norwegian	✓	✓	
Polish	✓		
Portuguese (Brazilian)	✓	✓	✓
Russian	✓		
Spanish (European)	✓		✓
Spanish (Latin American)	✓		✓
Spanish (Mexican)	✓		✓
Swedish	✓	✓	

a. 7920 and 7936 IP Phones do not support any localization.

b. SPA 525G IP Phone does not support any localization.

c. Katakana is supported by 7905, 7912, 7940, 7960 and SPA 5xx. Kanji is supported by 7911, 7941, 7961, 7970, and 7971.

Country	Dial Plan
Argentina	✓
Australia	✓
Austria	✓
Belgium	✓
Brazil	✓
Chile	✓
China	✓
Columbia	✓
France	✓
Germany	✓
Hong Kong	✓
Indonesia	✓
Ireland	✓
Italy	✓
Japan	✓
Malaysia	✓
Mexico	✓
Netherlands	✓
New Zealand	✓
North America	✓
Norway	✓
Philippines	✓
Singapore	✓
Slovenia	✓
Spain	✓
Sweden	✓
Switzerland	✓
Taiwan	✓
Thailand	✓
UK	✓
Venezuela	✓

Hardware Specifications

The hardware specifications for the Cisco UC 540 include physical specifications, environmental specifications, power specifications, and regulatory compliance. Table 12 lists the physical specifications. Table 13 lists the power requirements for the platform. Table 14 provides the environmental specifications, and Table 15 shows the compliance information.

Table 12. Physical Specifications for the Cisco UC 540

Feature	Description
Packaging type	Desktop form factor (1.5 Rack unit high)
Console port (up to 115.2 kbps)	1
Auxiliary port*	1

* The auxiliary port on the Cisco UC 540 is the same as the console port. The port has an ability to auto-detect modem tones and switch over to the auxiliary port functionality.

Table 13. Power Specifications for the Cisco UC 540

Feature	Description
AC input voltage	100 to 240V AC
AC input frequency	50 to 60 Hz
AC input current	4 to 2A (100 to 240V)
AC input surge current	50 to 100A (100 to 240V)
Maximum inline power distribution	82W
Power dissipation (AC without IP phone)	80W 90W (including external adapter)
Power dissipation (AC with IP phone)	175W 180W (including external adapter)

Table 14. Environmental Specifications for the Cisco UC 540

Feature	Description
Operating temperature	32o to 104oF
Operating humidity	10% to 85% noncondensing, operating 5% to 95% noncondensing, nonoperating
Nonoperating temperature	4 o to 149oF (-20o to 65oC)
Operation altitude	104oF (40oC) at sea level 87.8oF (31oC) at 6000 ft (1800 m) 77oF (25oC) at 10,000 ft (3000 m) 34.7oF (1.5oC) per 1000 ft
Dimension (H x W x D)	2.625 x 10.5 x 11.05 in. (6.67 x 26.67 x 28.07 cm)
Power supply dimensions (H x W x D)	1.7 x 4 x 7.5 in. (4.3 x 10.16 x 19.05 cm)
Rack height	1.5 rack unit (RU)
Weight (fully configured)	8 lb (3.63 kg)
Power supply weight	3 lb (1.36 kg)
Noise level (minimum and maximum)	Normal operating temperature: < 78℉ (25.6℃): 34 dBA > 78℉ (25.6℃) through < 104℉ (40℃): 37 dBA > 104℉ (40℃): 42 dBA

Table 15. Regulatory Compliance for the Cisco UC 540

Category	Compliance
Safety	• IEC 60950-1 • AS/NZS 60950.1 • CAN/CSA-C22.2 No. 60950-1 • EN 60950-1

Category	Compliance
	• UL 60950-1
Immunity	• EN 55024 • EN 300-386 • EN 61000-6-2 • EN 50082-1 • EN 55024 (CISPR 24)
Electromagnetic compatibility (EMC)	• FCC Part 15, ICES-003 • EN55022, CISPR 22 • AS/NZS • CNS13438 • VCCI V-3 • EN 55024 • EN 300-386 • EN 61000-3-2 • EN 61000-3-3 • EN 50082-1 • EN 55024 (CISPR 24) • EN 61000-4-2 • EN 61000-4-3 • EN 61000-4-4 • EN 61000-4-5 • EN 61000-4-6 • EN 61000-4-8 • EN 61000-4-11 • EN 61000-6-2
Telecommunications	• FXS/DID • TIA-968-A3 • CS-03 Part I • ACIF S002 • ACIF S003 • ANZ PTC200 • ISDN BRI S/T (voice and data BC) • TIA-968-A3 • CS-03 Part VI • TBR3 • ACIF S031 • ANZ PTC200 • MPMHAPT Japan Digital • FXO • TIA-968-A3 • CS-03 Part I • TBR21 • MPMHAPT Japan Analog • ACIF S002 • ACIF S003 • ACIF S004 • ANZ PTC200 • MOH interface • ACIF S038 • ACIF S004 • TIA-464C

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