

TELOS Hx6

ADVANCED SIX-LINE POTS/ISDN TALKSHOW SYSTEM



Hx6 GIVES YOUR TALK SHOWS AN INSTANT UPGRADE.

Say hello to Hx6, the advanced six-line Talkshow system from Telos. Equipped with powerful Telos hybrids and a full suite of audio processing capabilities, including our renowned Digital Dynamic EQ, Hx6 extracts excellent caller audio from even the most unruly far-end connections.

Hx6 works with either POTS or ISDN phone lines, and comes equipped with dual hybrids for high-quality conferencing — the same advanced third-generation DSP technology used in the best-selling Telos Hx1 and Hx2 telephone hybrids.

With its huge feature set and superior sound quality, Hx6 gives an instant audio upgrade to any broadcaster who puts phone calls on-air, from song requests or morning show phoners to full-up call-in talk shows.

“HELLO CALLER... YOU’RE ON THE AIR.”

Hx6 represents the new breed of Telos talkshow systems, built to deliver the cleanest, most consistent call quality possible from even the most challenging calls. Hx6 combines two advanced telephone hybrids (each with its own independent AGC, noise gate, and caller override dynamics) with Telos’ famous Digital Dynamic EQ, a sophisticated multiband equalizer which analyzes and adjusts received audio spectral characteristics so that calls sound smooth and consistent despite today’s wide variety of phone sets and connection types. All of this is optimized using carefully-tuned DSP algorithms.

But there’s more: Hx6 features caller audio sweetening, provided by the audio processing experts at Omnia, along with special echo cancellation to help tricky VoIP and cell-phone calls sound their best, and anti-feedback routines that tackle the acoustic feedback that plagues open speaker applications.

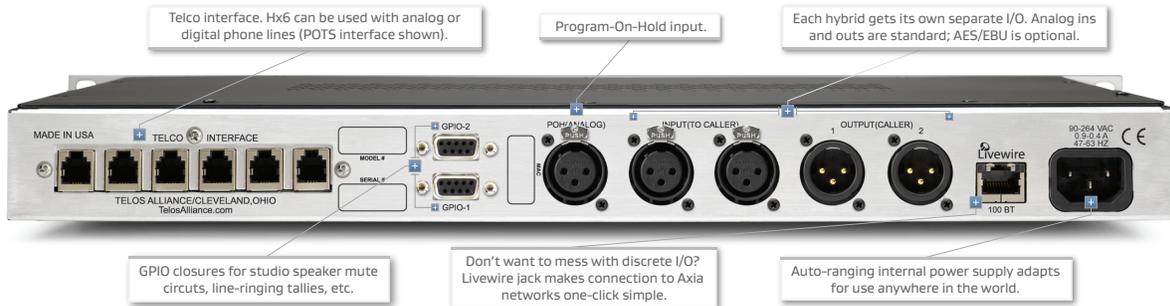
Hx6 OVERVIEW



FRONT PANEL

Like all Telos talkshow systems, the Hx6 front panel is simple and informative. Talent gets just the right amount of information – never too much or too little.

Separate send-and-receive meters for each hybrid give talent confidence with just a glance; an annunciator shows Program-On-Hold audio presence as well. There's a bright, high-resolution OLED display for setup, and a set of intuitive navigation keys for making quick adjustments.



CONNECTION PANEL

Around back, you'll find I/O and Telco connections. Hx6 works with either analog or digital telephone lines; just specify POTS or ISDN when you order. Hx6 connects directly to 6 incoming POTS lines, or 3 ISDN BRI lines (which provide 6 caller channels). Separate analog I/O is provided for each hybrid; AES/EBU is optional. There's also a Program-On-Hold input, GPIO connections for speaker muting, ring tallies, *et cetera*.

There's also an Axia Livewire Ethernet port on the back panel. Through that jack, Hx6 puts audio, hybrid control and mix-minus for all six phone lines onto one single skinny CAT-5 cable. Setup is simple: plug it into your Axia network, do some fast web-based configuration, and your talent can control Hx6 right from your Axia iQ console. The Ethernet jack also provides access for remote setup and administration, call-screening applications that run on your producer's PC, and communication with VSet6 phone controllers and in-console control modules.

EASY, INTUITIVE CONTROL.



VSET6

The Telos VSet6 six-line phone controller is an IP-based phoneset with a large, high-contrast color LCD panel that provides line status and caller information. There's almost no learning curve; VSet phones work like traditional Telos controllers, with calls being selected, held, and dropped in the way to which operators have grown accustomed. VSet6 connects simply via Ethernet; its large, colorful VGA LCD display provides intuitive operation and setup, and exclusive animated Telos Status Symbols™ icons give producers and talent line and caller status at a glance. VSet6 makes it easier than ever to run a fast-paced, high-energy talkshow with accuracy and efficiency. Hx6 supports up to eight VSet6 controllers per system — or mix-and-match them with console controllers and call-screening apps for maximum flexibility.



TRANSFER



ADDRESS BOOK



BUSY ALL



DEVICE CONFIG.



DIALED CALLS



ON AIR



AUTO ANSWER



RECORD



CHAT



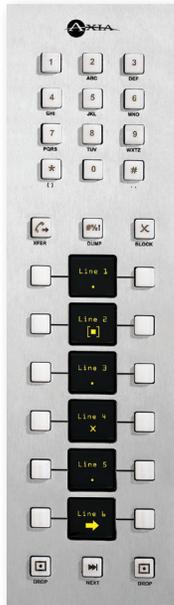
MISSED CALLS

VSET CONTROLS

Easy-to-understand VSet controls, with a friendly visual interface, let talent manage incoming lines, lock calls on-air, start an external recording device, and take a queue of calls to air sequentially, for precise management of multi-call interviews or conferences. The LCD display delivers detailed line status, caller information, caller ID, time ringing-in or on-hold, and even comments entered in the Broadcast Bionics Xscreen screening software application (more about this later)

A built-in address book and call history log round out VSet6's features. And, just like the Hx6 itself, each VSet6 has its own web server for easy remote configuration and software upgrades.

EASY, INTUITIVE CONTROL.



CONSOLE CONTROLLERS

Hx6 works with any brand of broadcast console. But wouldn't it be great if talent could take control of phones without ever having to divert their attention from the board? Whether your shows consist of live calls or pre-recorded interviews, phone segments are usually fast-paced with little room for error. But traditionally, the phone system was separate from the on-air console, making it hard to use both together efficiently, leading engineers and talent to ask: "Why can't the console and the phone system work together?"

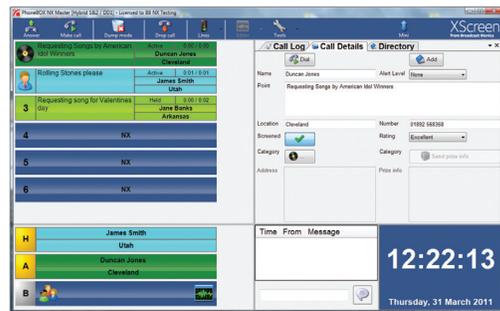
Now, they can. Hx6 can connect directly to Axia mixing consoles using Livewire IP-Audio to eliminate the cost and complexity of old-style inputs, outputs, and mix-minuses. IP-Audio networking technology provides the ideal way to integrate broadcast phones into the on-air console — the control center of every studio. Users enjoy seamless console integration, with phone controls right on the board so that talent can dial, answer, screen, and drop calls without ever diverting their attention from the console. Information about line and caller status can be displayed right on the console as well.

There are plenty of other advantages to melding phones with consoles. Like ease of installation: IP-Audio consoles with built-in phone controllers don't need any additional wires or connections. Their control signaling, caller audio and backfeeds ride on the network connection that's already there. Bringing caller audio into the IP-Audio domain makes it routable like any other audio source. And since the console now communicates directly with the phone hybrid, mundane tasks such as mix-minus generation, starting recording devices, and playback of recorded off-air conversations can all be automated.

CALL SCREENING SOFTWARE

For PC-based call screening, Hx6 comes complete with XScreen Lite from Broadcast Bionics. When they asked if they could use these products as a platform for their new XScreen product, it took us about a millisecond to say "yes!" Partly because we believe in open standards and the benefits of partnerships, but also because we think XScreen is very cool.

XScreen Lite's interface gives screeners and hosts tons of information and control using sophisticated visual talk-back, including a drag and drop database of all calls for your show as well as a phonebook and visual warnings for persistent or nuisance callers. A fully-functional copy of XScreen Lite is provided to all Hx6 customers, but an upgrade to the full XScreen client software adds even more features, including extended call history, an enhanced phonebook, prize management, powerful GPIO functionality plus more. XScreen, deployed as part of a Livewire network, also enables call recording, editing and console integration directly over the network.



FEATURES ATA GLANCE

- » Six line capacity; works with POTS (analog) or ISDN (digital) phone lines.
- » Our most advanced digital hybrids, with DSP algorithms optimized for superior performance with today's wide variety of incoming call types.
- » Telos DDEQ (Digital Dynamic EQ) and adjustable smart-level AGC, which provide spectrally consistent audio from call to call — even on notoriously tough cellular calls.
- » Excellent trans-hybrid loss of >55dB
- » Smooth, proven symmetrical wide-range AGC by the audio processing experts at Omnia Audio.
- » Studio adaptation and a subtle, inaudible pitch shifter that work together to prevent feedback in open-speaker studio environments.
- » A sophisticated caller override that improves performance and allows precision adjustment of the degree to which talent audio “ducks” the caller audio.
- » Striking Telos VSet6 six-line phone controllers with large, colorful VGA LCD displays that provide intuitive operation and setup. Telos-exclusive Status Symbols provide producers and talent with animated, high-contrast icons that communicate line and caller status at a glance.
- » Three different Hx6 versions matched to your choice of analog POTS phone lines, ISDN-S (Europe), or ISDN-U (North American) digital phone lines.
- » Caller ID for both analog and digital telephone connections, which is displayed on the VSet6 phoneset and the included XScreen Lite call screening application.
- » Livewire IP-Audio that enables fast, one-cable integration with Axia networks, and provides Axia board operators with seamless, on-console control of multiple lines and hybrids. Standard Ethernet backbone provides a common transport path for both studio audio and telecom needs, resulting in cost savings and a simplified studio infrastructure.
- » Choice of standard Analog I/O or optional, extra-cost AES/EBU I/O.
- » Easy setup and configuration via Ethernet using any PC and your favorite Web browser.
- » XScreen Lite call screening software from Broadcast Bionics, provided at no cost with Hx6 systems.

FAQs

SO, WHAT'S THE MINIMUM CONFIGURATION TO HAVE A MULTILINE PHONE SYSTEM FOR MY STUDIO?

A Telos Hx6, plus a Telos VSet6, is all you need. That's it! You can add more VSet6 phones any time by also adding a small Ethernet switch.

I SEE THAT THE Hx6 COSTS MORE THAN YOUR ONE-X-SIX. WHAT'S THE DIFFERENCE?

The first and biggest difference is in technology. Hx6 reflects more than 20 years of telephone expertise and technology improvements, compared to ONE-x-Six. The dual hybrids Hx6 contains are designed specifically to make calls from today's mobile and VoIP phones sound great, and the automatic DDEQ keeps callers sounding consistently good, call after call.

More differences: Hx6 has two built-in hybrids; ONE-x-Six has only one. This means you can easily create high-quality conferences between callers — no “button mashing” to assign multiple callers to a single hybrid. You can bring them to your console on one fader, or assign two callers to two individual faders. Hx6 also gives you the option of using digital (ISDN) or analog (POTS) phone lines. And the ONE-x-Six allowed for only 2 phone controllers; Hx6 can handle up to a dozen, for true operational flexibility at your talent, producer and screener positions.

SO I CAN USE Hx6 WITH POTS OR ISDN PHONE LINES?

Yes. Just specify which interface you want when you order your Hx6.

I'VE HEARD A LOT ABOUT DDEQ. WHAT IS IT?

Digital Dynamic Equalization is a technology pioneered by Telos. It's extremely sophisticated digital processing that makes your caller audio sound fantastic, whether the far end is using analog, digital, VoIP or cell.

HOW DOES DDEQ WORK?

Everyone know that the tonal quality of telephone audio varies widely. Starting with the quality of the caller's phone itself, there are numerous factors that affect the end-to-end frequency response of a call. And every call presents a different set of tonal conditions. DDEQ correctively equalizes spectral degradation by using digital signal processing to evaluate the spectral integrity of the caller audio; it does this by looking at instances of broadband audio and comparing it to a known flat reference. If your caller's audio is tonally unbalanced, the Hx6's DDEQ makes appropriate corrections to the high and low bands with reference to the center band.

WILL I HAVE TO FIDDLE WITH A BUNCH OF SETTINGS TO MAKE IT SOUND GOOD?

No, DDEQ equalization is totally automatic — no tweaking needed! The system compensates for spectral problems based upon what we've determined to be a typical spectral mix; the frequency breakpoints, time constants and other equalizer characteristics have been carefully designed by our telephone experts to extract optimal performance from all telephone lines.

FAQs

YOU MENTIONED Hx6 HAS OMNIA AUDIO PROCESSING. WHY?

Dynamics processing is pretty critical to get the best audio from your phones. Levels from caller to caller can vary as much as 30dB! As you probably already know, the audio processing gurus at Omnia are the world's best. So we asked them to design some dynamics processing for our phone systems, to make caller audio really sing. They built us a very smart, automatic dynamics control that works on both the talent's send signal and the caller's received audio.

HOW DOES THE AUDIO PROCESSING WORK?

The Omnia dynamics processor uses intelligent, dB-linear gain control with a feed-forward topology to apply the least amount of processing necessary. This helps preserve the natural characteristics of the caller's voice. The input gain section compensates for widely varying levels without amplifying noise; the output gain section is cross-coupled to the input section so that any hybrid leakage that occurs isn't pumped up. There's also a downward expander that subtly reduces phone line noise while distinguishing and passing low level callers. When all of this is combined with our DDEQ digital dynamic equalizer, the result is clean, clear, undistorted caller audio — a difference you and your callers will definitely hear.

DOES Hx6 SUPPORT CALLER ID?

Yes, on both analog and digital phone lines.

EXACTLY HOW MANY VSET6s CAN I CONNECT TO AN Hx6? I NEED ONE FOR THE SCREENER, ONE FOR THE BOARD OP, AND TWO FOR TALENT.

You can have as many as 12 control devices connection to an Hx6 system. This can be a mix of VSets, Console Controllers and screening software clients, or all of one type. If you won't be using the Livewire Audio I/O from the Hx6, you can use most any modern Ethernet switch to connect them to the Hx6. If you use Livewire AoIP, an approved Ethernet switch is needed — see AxiaAudio.com/switches/ for a guide to choosing your switch.

CAN THE VSET6 PHONE BE DIRECT CONNECTED TO THE Hx6 USING JUST A POWER INSERTER, OR IS AN EXTERNAL ETHERNET SWITCH NEEDED?

No switch is needed to connect a single VSet6 to the Hx6, and we include a power inserter with each phone. However, if you want to connect more than just one VSet6 phone, an Ethernet switch is needed.

I SEE THAT Hx6 HAS LIVEWIRE. WHAT IF I DON'T HAVE OTHER LIVEWIRE GEAR?

No problem! Hx6 is very flexible; all the traditional analog audio INs and OUTs you expect are right on the back panel, in XLR format, for connection to any traditional console. And if you have a Livewire network and Axia console, or plan on having one in the future, the Livewire connection is ready — it carries all of the phone system's I/O and GPIO via a single Ethernet connection.

ARE AES/EBU CONNECTIONS AVAILABLE?

Yes, you can order your Hx6 with AES3 I/O instead of analog at a small additional cost.

DO I NEED AN ETHERNET SWITCH TO USE Hx6?

Not necessarily. If you plan on using just a single VSet6 phone to control your Hx6, you can connect it directly to the Ethernet port on the Hx6 back panel — no switch needed. If you want to use more VSet phones, or call screening software to control your Hx6, you'll need a switch.

DOES Hx6 REQUIRE AN AXIA CONSOLE TO WORK?

No, Hx6 works perfectly with any standard console. If you do have an Axia console, however, you benefit from enhanced integration with the console that will allow your talent to control the phone system directly, without diverting their attention from the board.

WHAT KIND OF ETHERNET SWITCH CAN I USE?

You can use a wide variety of switches, depending upon whether you're using Hx6 with an Axia Livewire network. If you're not connection to a Livewire network, you can connect your Hx6 to any "garden variety", unmanaged Ethernet switch to connect multiple VSet6 phones, access the Hx6's built-in configuration web pages with your PC, or screen calls using the included XScreen Lite software.

If you're connecting your Hx6 to a Livewire network, however, you'll need an Ethernet switch that's been qualified for use with Livewire networks. If you have an Axia PowerStation, QOR.16 or QOR.32 integrated console engine, you can make use of the switch that's a part of those units, or any available ports on your network's core switch.

TELOS Hx6 SPECIFICATIONS

PROCESSING FUNCTIONS

GENERAL

- Telos 3rd-generation Adaptive Digital Hybrids
- Telos Exclusive Feedback Reduction Functions

SEND (TO CALLER) PROCESSING

- High-pass Filter
- Frequency Shifter
- AGC/Limiter
- Program-on-Hold AGC/Limiter
- Sample Rate Conversion (with AES option)

RECEIVE (FROM CALLER) PROCESSING

- High-pass "Hum" Filter
- Smart AGC / Platform Leveler
- Noise Gate
- Telos DDEQ (Digital Dynamic Equalization) 3-band Adaptive Spectral Processor
- Sample Rate Conversion (with AES option)

ANALOG INPUTS

- Send Analog Inputs: 2x
- Program-on-Hold Analog Inputs: 1x
- Connector : XLR Female, Pin 2 High (Active Balanced with RF Protection)
- Input Level: Adjustable from -7 to +8 dBu (nominal)
- Analog Clip Point : +21 dBu
- Impedance: Bridging, > 10K Ohms
- Analog-to-Digital Converter Resolution: 20 bits

ANALOG OUTPUTS

- Receive Analog Outputs: 2x
- Connector: XLR Male, Pin 3 High
- Output Level: Adjustable from -7 to +8 dBu (nominal)
- Impedance: <50 ohms
- Digital-to-Analog Converter Resolution: 24 bits
- Headroom Before Clipping: 20 dB headroom above 4dBu nominal levels

AES DIGITAL INPUT / OUTPUT (OPTION)

- Overview: Plug-in module converts the XLR inputs and outputs to AES3, providing 2x in on two XLR-Fs and 2x out on two XLR-Ms.
- Rate Conversion: Sample Rate Converters on all inputs and outputs. Inputs can accept 32, 44.1, and 48kHz rates. Clock for outputs may be sourced from the AES inputs or internally-generated, locked to the ISDN network.
- Input Level: Adjustable from -27 to -12 dBfs
- Output Level: Adjustable from -27 to -12 dBfs

AUDIO PERFORMANCE

- Frequency Response: ± 5 dB, 50 to 20 kHz (swept sine procedure, measured from analog input to output with unit in loop-back mode)
- THD+N/Input: <0.06% typical (measured at 0dB @ 1kHz analog in to AES out in loop-back mode)

SWITCHING MATRIX AND CONFERENCING

- Audio Routing and Switch: All Digital
- Telephone Lines: 6
- Hybrids: 2
- Studio Inputs: 2
- Studio Outputs: 2
- Program-on-Hold: 1

CONTROL PORTS

- Ethernet 100Base-T
 - » Web server for configuration and software update
 - » Telnet for command line control and diagnostics
 - » Call Screening Interface server allows up to 8 instances of call screening software to connect simultaneously
- General purpose Input/Output: 2x 15-pin D-sub with status outputs and control inputs.

ISDN TELEPHONE CONNECTIVITY

- Protocol Compatibility
 - » National ISDN 1 and 2
 - » DMS-100 Custom Function
 - » AT&T 5ESS Custom Point-to-point
 - » Euro-ISDN conforming to the Net 3/ETS300 Protocol

TELOS Hx6 SPECIFICATIONS

▶ Interface

- » USA & Canada: Integrated NT1 for direct connection to ISDN line via the two-wire U-interface (6-position/2-pin RJ-11 connector) 2B1Q Line Encoding
- » Worldwide: 4-wire S-interface (8-position / 8-pin RJ-45 Connector)

▶ Telephone Coding Modes

- » μ Law (ISDN Proto set to Natl I-1, AT&T Custom, Q.931mu or DMS Custom)
- » A-Law (ISDN Proto set to ETS-300)

ANALOG TELEPHONE LINE CONNECTIVITY

- ▶ Universal interface for worldwide application
- ▶ Programmable loop current
- ▶ Programmable ring and disconnect signaling (loop drop or tone)
- ▶ Programmable Flash time
- ▶ Caller ID decoding using Bellcore 212 modem standard

CONTROL INTERFACE

- ▶ Up to 12 attached controllers (any mix of VSet6 phones, Console Controllers or screening software) via Ethernet connection.

ABOUT TELOS

Steve Church founded Telos Systems in 1985. As both a talk show host and radio group Technical Director, Steve was only too familiar with the frustrations of “bad phones” and even less responsive equipment manufacturers, so he set about eliminating the technical problems that plagued radio call-in segments.

In 1984, he invented the Telos 10, the first DSP-based telephone-to-broadcast interface system – allowing radio stations to significantly improve the technical quality of call-in segments. The overwhelming response to Steve’s economical and technically elegant solution to a nagging problem provided the spark from which Telos was born.

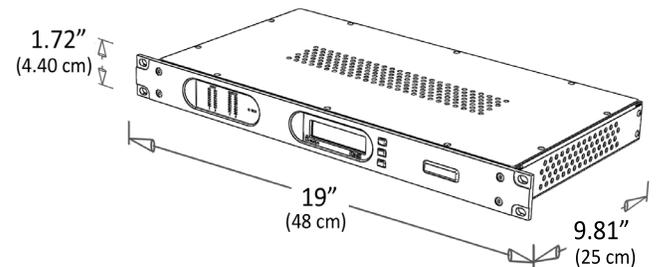
A lot’s happened since then. We pioneered the use of MPEG Layer 3 coding in the revolutionary Zephyr ISDN codec. We produced

POWER

- ▶ Internal supply, 85–250 VAC auto-switching, 50–60 Hz.
- ▶ Power consumption: 14.2 Watts

DIMENSIONS

- ▶ 19” (48.3 cm) standard rack mounting front panel
- ▶ 1.75” (4.5 cm) height, 6.5” (16.51 cm) depth
- ▶ Shipping Weight: 8 lbs. (3.62 kg)
- ▶ Shipping Dimensions: 24” x 14” x 6” (61 cm x 35.6 cm x 15.25 cm)



the first hardware MP3 streaming encoder for broadcast. We developed the world’s first “whole-plant” broadcast phone system. And we invented the IP-networked radio console, and then integrated broadcast phones into that network via Ethernet.

Telos has grown steadily since our initial production run of 25 Telos 10 units in 1985! With tens of thousands of systems in the field, it now is hard to find a broadcast facility in the world without at least one piece of our gear. Our organization, now called The Telos Alliance, includes the Omnia Audio, Axia Audio and Linear Acoustic brands, and our R&D department – the largest research team in broadcasting – continues to develop innovative audio products for radio and television broadcasting, telephony, and the Internet.