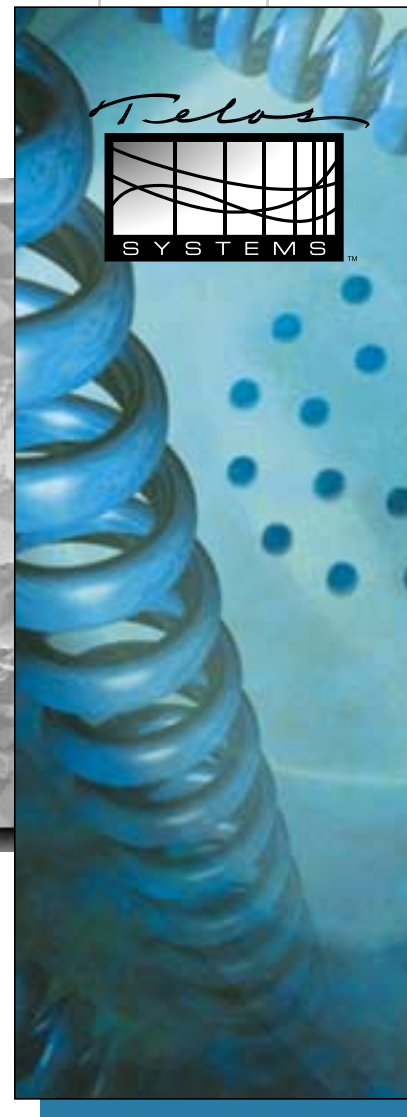


Digital Talk Show System
from Telos



TWOx12 DIGITAL TALK SHOW SYSTEM

It's what's next

Introducing the next generation of radio talk show systems: the revolutionary TWOx12 from Telos Systems—the leader in broadcast telephone technology.

TWOx12 is a self-contained 12-line on-air phone system with two all-digital hybrids for high-quality conferencing. Exclusive Telos Desktop Directors (sophisticated yet easy-to-use control stations) make fast-paced production a snap. And caller management has never been simpler, thanks to Telos Status Symbols, clear, easy to read graphical icons that convey line and caller status at a glance.

The TWOx12 is the only multi-line talk show system that plugs right into ISDN BRI phone lines, taking advantage of the decreased noise and distortion, better audio levels, and clearer caller audio that only a digital connection can provide (as well as eliminating the Telco A/D-D/A process in your studio). Use it now with POTS lines; use it with digital phone lines when you're ready.



The Telos TWOx12 is the easiest upgrade path from analog to digital.

Put the power of ISDN to work with the exceptional new Telos TWOx12. It's what's next in talk show management.

FEATURES & BENEFITS

Small package,
Big capabilities.

Telos products have earned a well-deserved reputation for ease of use, engineering excellence and outstanding performance. So, as you'd expect,

the TWOx12 Digital Talk Show System contains all the state-of-the-art features you need for a successful, easy-to-manage talk show operation.

- 2-RU package includes two high-performance digital telephone hybrids and a 12-line broadcast phone system for high-quality conferencing between callers—no need for any external equipment.

- Unmatched send/receive separation using advanced adaptive cancellation technology. Hybrid automatically adjusts to phone line conditions, eliminating the hollowness, feedback and distortion that occurs when send audio “leaks” into the caller output signal.

- AGC/limiting functions plus three-band dynamic equalization ensure consistent caller audio levels and spectral consistency. Studio-grade 20-bit A-to-D conversion, combined with noise gating and shaping, delivers crystal clear caller audio, even when using POTS lines.



TWOx12 has clear, user-friendly front panel meters and controls for unparalleled ease of setup.

- Even if you don't have ISDN in your studio yet, the TWOx12 gets you ready for the future. Start with POTS inputs and upgrade to ISDN inputs whenever you're ready.



MORE FEATURES AND BENEFITS

- Up to four Telos Desktop Directors can be used with the TWOx12 to maximize flexibility and control. For even more control, add optional Windows®-based

Assistant Producer call screening software to facilitate instant producer/host communication via LAN or WAN.

- Busy All function lets talent clear contest lines with just the touch of a button.
- Simultaneous baseband analog and AES/EBU outputs.
- Automatic high-precision sample rate conversion for send to caller input.

- Caller ID support and fully adjustable caller ducking helps hosts stay in control.
- Built-in Ethernet connection for remote control and easy software upgrades.



Optional Telos Assistant Producer software for Windows® adds remote screening capabilities.














**STATUS
SYMBOLS™**
For Total Control

Caller management has never been easier. You can screen calls quickly and efficiently using the built-in handset, speakerphone or optional headset. Hosts receive immediate information

about line availability, on-hold and ready-for-air queue status from intuitive, graphical Status Symbol icons—a Telos exclusive.



The intuitive, "quick read" Status Symbols make line selection easier than ever.

-  Line Available
-  Line in use elsewhere
-  Line ringing in
-  Call on handset
-  Call on speakerphone
-  Call on hold
-  Call screened and ready for air
-  Call is next in ready-for-air queue
-  On air call on Hybrid 1
-  Locked on air, Hybrid 1
-  On air call on Hybrid 2
-  Locked on air, Hybrid 2
-  Busy all

Status Symbols—crystal clear, no mistakes



TALK DIGITAL TO ME

The ISDN advantage

Integrated Services Digital Network (ISDN)

is a set of international standards for digital transmission over ordinary telephone copper wire (as well as over

other media). Presently, the dial-up telephone network is nearly entirely digital, except for the "last mile" copper connections from the Central Office to the customer's site. Telos' new ISDN hybrids take advantage of this technology to deliver crystal clear caller audio to the radio studio.

Even though it takes two separate circuits—one send and one receive circuit—to transmit telephone audio, traditional analog lines multiplex both circuits in order to use a single pair of wires. This causes what's referred to as "leakage"—when the announcer's audio is present on the hybrid output, creating

an annoying "hollow" sound. A "four-wire" circuit has two wire pairs, and therefore two independent audio paths. Digital circuits are designed to always offer independent and separated signal paths. (Though a digital circuit may today not use wires at all, but rather fiber, or microwave radio, or satellite, telephone engineers, bowing to tradition, continue to refer to all separated speech paths as being "four-wire.")

While the application of digital signal processing to the problem of separating host and caller audio—pioneered by Telos and used in all of our ISDN hybrid interfaces—has made a dramatic improvement over pure analog systems, using digital phone lines for incoming calls further improves performance for several reasons:





■ **Lower Noise.** Analog lines are exposed to a variety of noise and impulse trouble-causers as they move across town on poles and through your building. Hum is the main one,

owing to line proximity to pole transformers and power lines, but there are also sources of impulse noise from motors, switches, and other electrical activity. By contrast, digital circuits aren't susceptible to induced noise; digital lines convey the bits precisely and accurately from the phone network to your studio equipment without any inductive disturbance, so the audio remains clean. Even when the caller is using an analog phone line to call in, the noticeably quieter digital connection between the hybrid and the telephone network helps the hybrid achieve better rejection of outgoing audio leakage.

■ **Elimination of D-to-A conversion.** The analog-digital conversion equipment used in telephone central offices is of poor quality compared to the con-

verters used in professional audio equipment. Using a digital phone line enables you to maintain a digital path all the way from the caller's CO to your studio equipment—requiring only the initial conversion to digital, and doing away with the need to reconvert from digital to analog audio. (AES/EBU outputs are provided in the Telos TWO ISDN hybrid, TWOx12 Talk Show System, and Series 2101 Talk Show System to help accomplish this direct connection to digital studio gear.)

■ **Higher Gain and Reduced Feedback During Multi-line Conferencing.** When conferencing is required on 2-wire circuits, very good hybrids are needed to separate the two audio paths in order to add gain in each direction. When the gain around the loop exceeds unity, the unpleasant result is feedback. Since the conference path usually includes four AGC functions, the hybrid must be able to cover the additional gain that may be dynamically inserted. Because of the 4-wire nature of digital telephone lines, the hybrid function is more effective—and more reliably so across a variety of calls. That means more gain can be

inserted between calls before feedback becomes a problem.

■ **Better Line Monitoring, Call Setup and Supervision.** On an analog line, one discovers a problem only from a failed attempt to use the line. Digital phone lines maintain a full-time connection between the Central Office and your studio on the "D" channel, so you can quickly detect when a line is not working.

■ **Furthermore,** the sophisticated transactions on the "D" channel keep both ends of a call accurately informed about line status. For starters, digital lines feature call set-up times of only a few milliseconds, enhancing production of a fast-paced show. More importantly, when a caller disconnects while waiting on hold, this status change is communicated instantly (contrasted with the usual 11-second delay on most analog lines). One of the most common complaints of talk hosts is that they go to a line where they expect a caller, only to find a blaring, annoying dial tone. The chance of this happening with a digital line is close to zero.

TWOx12 CONFIGURATION OPTIONS

The Telos TWOx12 employs a modular architecture that uses either POTS or ISDN BRI telephone lines.

Each Telos TWOx12 has four positions for telephone

company line Interface cards, which have either POTS (three incoming calls per card) or ISDN BRI interfaces (two BRI lines per card for a total of four incoming calls per card, three cards maximum). Changing these cards enables the TWOx12 to operate with either analog or digital telephone circuits. Upgrading a TWOx12 configured for POTS to use BRI is as simple as changing the line interface cards. A mix of analog and digital incoming lines can be used simultaneously if desired.

A basic TWOx12 system as shown in Figure 1 includes:

- One TWOx12 rack unit containing dual digital hybrids and 12-line talk show system (Telos part #0212-0100 for North American ISDN, #0212-0200 for Non-North American ISDN, and #0212-0300 for POTS).
- Telos Desktop Director (One required, Telos part #2101-4000).
- One music-on-hold-source (optional, not supplied).

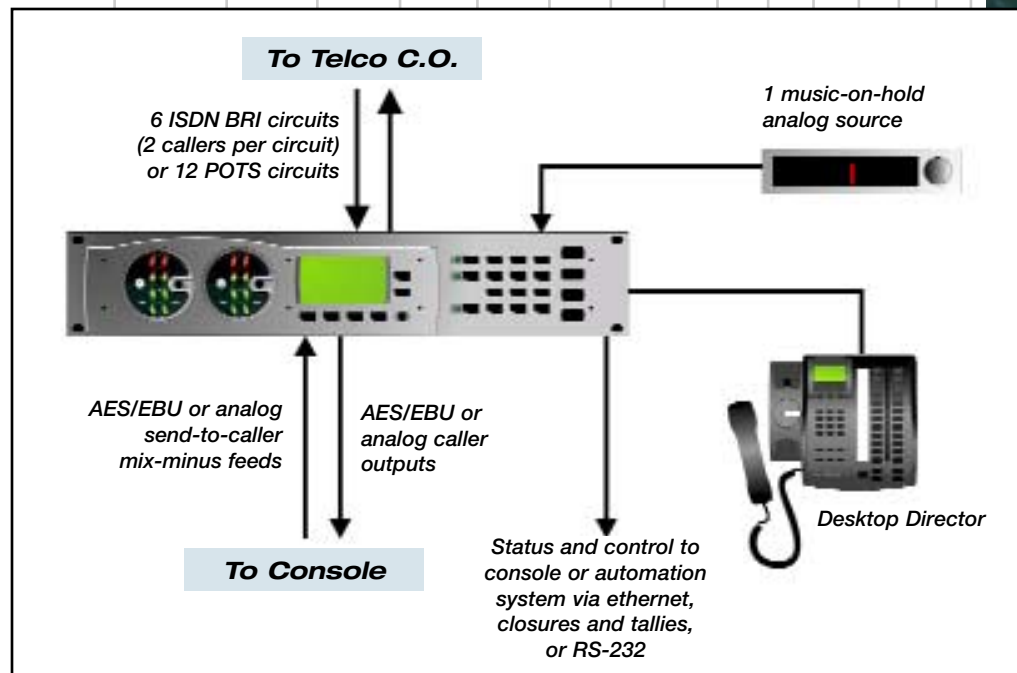


FIGURE 1

The Telos TWOx12 can be expanded for greater capacity and control, as shown in Figure 2, with the addition of:

- Up to three additional #2101-4000 Desktop Directors; a total of four may be used to facilitate sharing call-in lines among studios

or producer positions.

- Telos Assistant Producer call screening software for Windows® (Telos part #0955-0000), for local or remote producer capabilities across LAN or WAN.

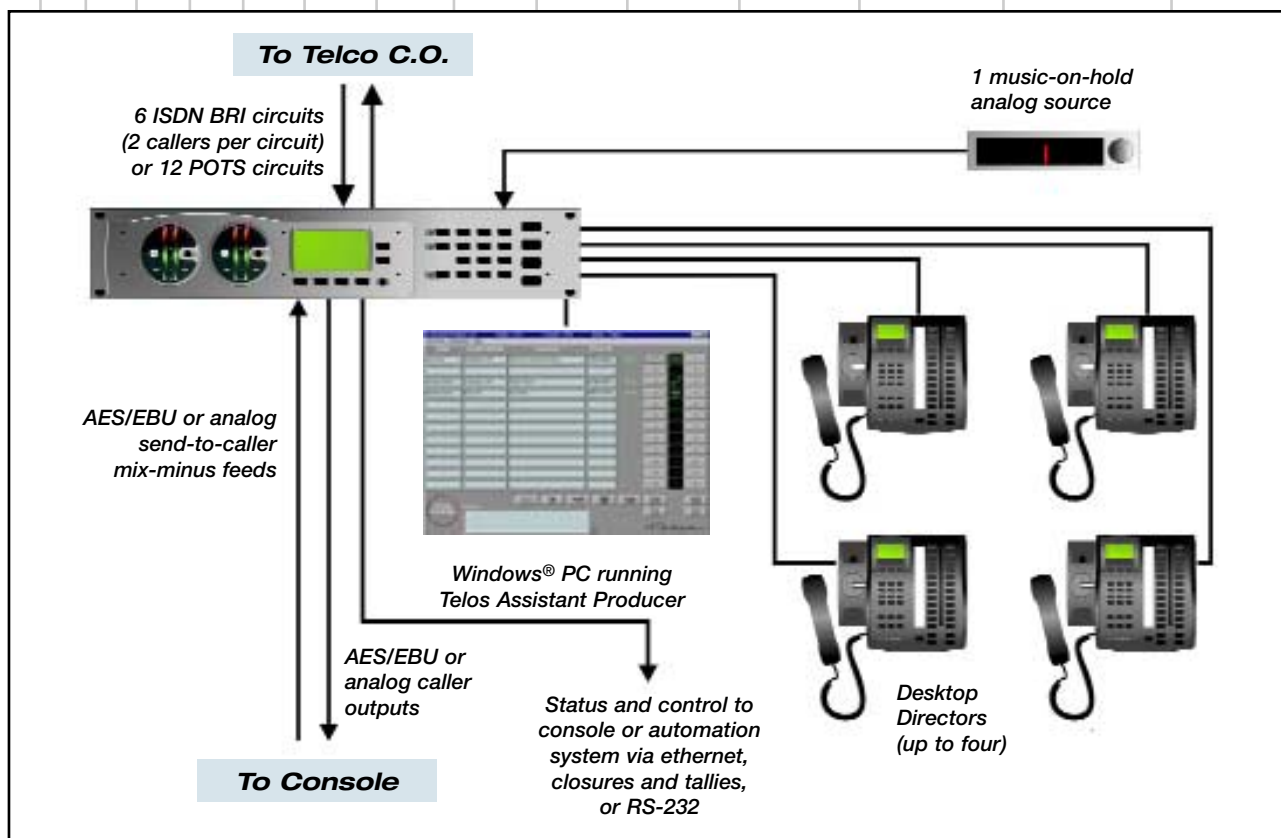


FIGURE 2

At the heart of the Telos TWOx12 are twin digital hybrids with an integrated suite of audio processing functions which provide optimum results from “real world” telephone connections. These functions include send/receive separation,

feedback reduction in the acoustic path, high-grade digital-to-analog conversion, adaptive dynamic equalization, called “ducking”, hum filtering, Caller ID and conference linking, as illustrated in the Signal Flow Chart in Figure 3.

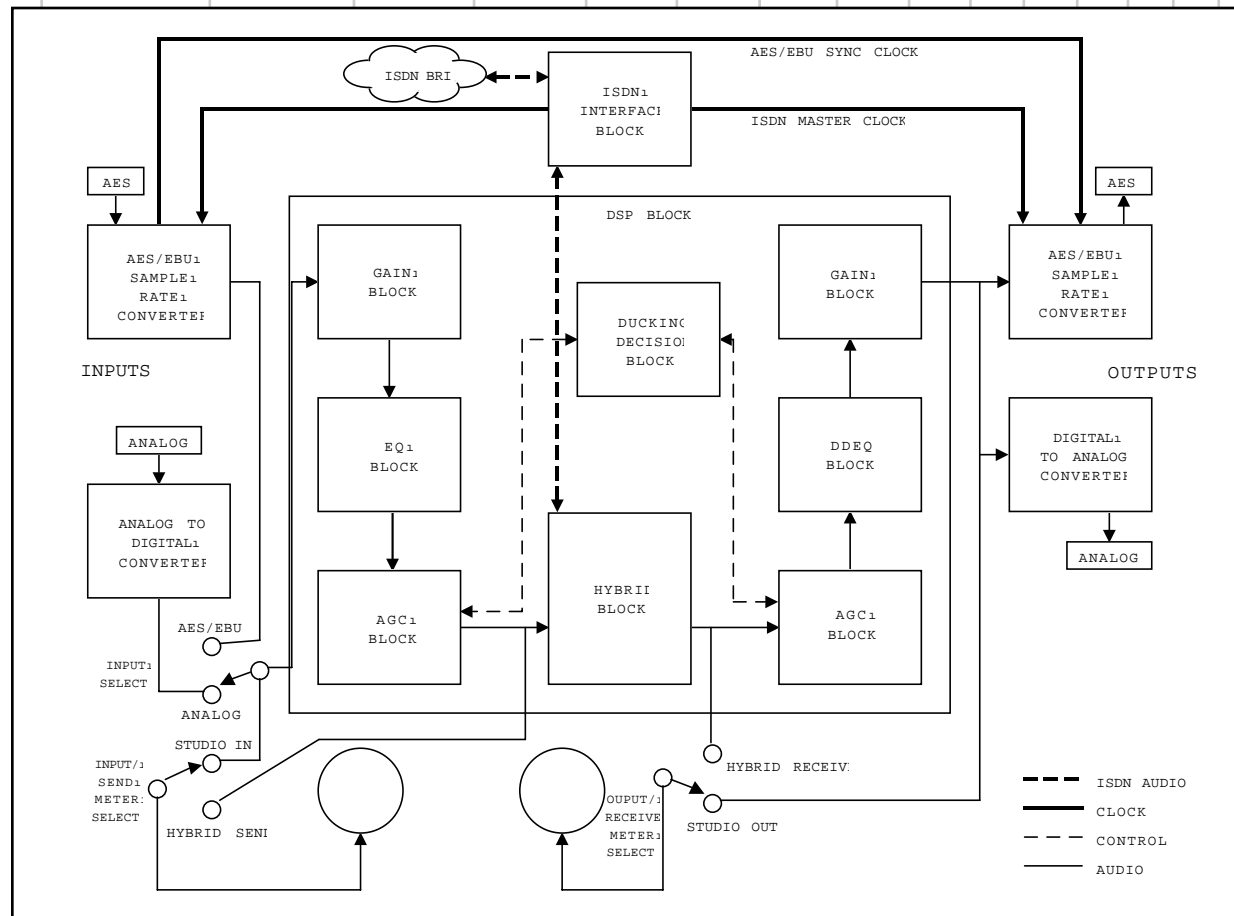


FIGURE 3





TECHNICAL INFORMATION

System Description

Digital multi-line talk show system. Accepts direct input from ISDN telephone lines (BRI U/S) as well as POTS lines. Caller capacity of up to 12 incoming lines.

Technical Specifications

Trans-hybrid Loss: -76 dBr RMS with white noise

Frequency Response (Caller to Output): 200Hz - 3500Hz, \pm 1dB

Receive Output: THD+N (@ 1 kHz, OdBu output) 0.06%; Dynamic Range -93dBFS

Signal-to-Noise: >88dB

Send Input: -0 to +8dBu nominal level with 13dB headroom before clipping

Coding Modes: A-law or μ -law (selectable)

Converter Word Length: Analog to digital 20 bits, digital to analog 16 bits

ISDN BRI: USA/Canada - 2 Wire U interface (built in NT1)
Worldwide - 4 Wire S interface

Power Supply: Internal 110/220 VAC

Dimensions & Weight

Rack mount is 19" wide

Depth does not include connectors

#0212-0100/0200/0300 TWOx12:

H: 2RU D: 13in/33cm Wt: 10lbs/4.5kg

#2101-0400 Desktop Director:

H: 3.5in/8.9cm D: 11.5in/25.4cm Wt:
10lbs/2.7kg

TWOx12 Accessories

- **#0955-0000 Assistant Producer** call screening software for Windows® allows networked LAN or WAN control of the talk show environment
- **#2101-4000 Series 2101 Desktop Directors** can be added for additional call management capabilities
- **#0212-1100/1200 ISDN Line Interface Cards and #0212-1300 POTS Line Interface Card** may be used to customize the mix of incoming caller lines. Consult your Telos dealer for details.
- **Plantronics Supra Polaris** producer's headset connects to the Series 2101 Desktop Director and allows hands-free screening when use of the built-in handset or speakerphone is not practical (*Plantronics #P51-U10P*; browse www.plantronics.com for the dealer nearest you)

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