

T ELOS ONE-x-Six



The ONE-x-Six has all of the telephone interface and control equipment needed for talk show programming. A single rack mounting unit houses both a Telos ONE digital hybrid and a six-line, broadcast phone system. For system control, the ONE-x-Six is packaged with our desktop Switch Console.

To meet the needs of smaller installations, we have made the ONE-x-Six very easy to install. Phone lines are connected using standard RJ-11 modular plugs. All Switch Console features found in our larger systems are fully implemented. A standard telephone set may be used for call screening.

Never before has Telos Systems offered this combination of performance and features at such a low price. The basic ONE-x-Six may be expanded with the addition of a second Switch Console or a second hybrid for improved conferencing.

Digital Hybrid Section

- True digital, with all processing performed in the digital domain.
- Trans-hybrid loss greater than 40dB.
- Sophisticated automatic gain control on input and output audio.
- Excellent in applications where open monitor speakers are used.

Phone System Section with Switch Console

- Six-line call selector.
- Program-on-hold.
- Caller screening and conferencing.
- Special function buttons to automatically select next caller, control external recorders and delays, and other unique features.



TALK SHOW SYSTEM

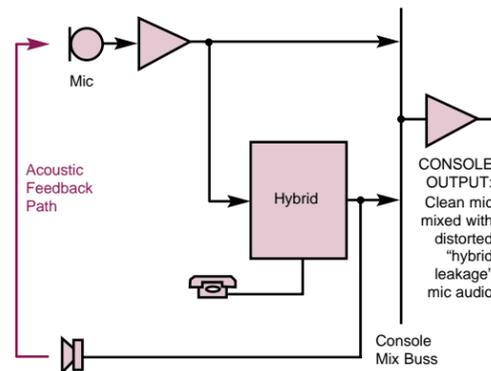
FEATURES AND BENEFITS

Hybrid Section

With the ONE-x-Six, successful talk shows sound great, are easy to produce, and won't cost a fortune. At the heart of the system is our Telos ONE digital hybrid telephone interface, which has earned its reputation for superior performance in thousands of installations worldwide. All processing is performed in the digital domain, including:

- An advanced digital auto-nulling hybrid with excellent send audio rejection. The built-in hybrid automatically adapts to each new call. Very pure caller audio appears at the output.
- An input gain processor with a smart, floating freeze-gain gate.
- A sophisticated output gain processor that provides level control and smart downward expansion. This section is cross-coupled to the input section so that telephone line noise and residual hybrid leakage are carefully and cleanly attenuated without low-level callers being gated off.
- A selectable override function to reduce the caller level about 8dB when input audio is present. This allows the talent's voice to have more presence when speaking at the same time as the caller.

SIMPLIFIED SIGNAL FLOW



- A pitch-shifter and an acoustic ducking function in the input audio path work together to allow significant gain-before-feedback when used with open monitor speakers. This feature is not found in the hybrids of any other manufacturer.

- High- and low-pass filtering to clean up phone line noise and hum.

Installation and set-up of the hybrid section of the ONE-x-Six is simple and easy:

- The input is switchable for either microphone or line level.
- Two outputs are provided, one of which may be used as a second independent output or be switched to a mix of the input and caller signals. This is very handy for tape feeds.
- Input and output gain levels are set from front panel, multi-turn screwdriver-adjustable pots.
- Monitoring of input and output levels, as well as their respective gain processing, is provided by an LED meter.

Phone System Section

The ONE-x-Six provides clean, quiet, and reliable switching of multiple telephone lines. Phone lines may be directly connected without intervening phone equipment. The provided desktop Switch Console is used for line selection and conferencing, and call screening is accomplished with a standard, user-provided single-line telephone set.

- Designed to provide the audio performance demanded by broadcast and other professional audio applications.
- Controls up to six telephone lines.
- Features include tone/pulse dialing, automatic next-caller indication, and control of external devices, such as audio recorders.
- Program-on-hold function incorporates automatic gain control (AGC) and has an XLR balanced input. Callers on hold hear audio you select while waiting to be placed on-air.

- Serial communications (RS-232) port allows integration with computerized screening and control systems, such as Telos' Call Screen Manager. The ONE-x-Six manual fully describes the data protocol for those who want to write their own software.

- Auto-answer feature connects incoming lines and places them on hold without operator intervention.

- Loop-through allows integration with other phone systems and PBXs.



We have kept the cost of the ONE-x-Six low by using intelligent software rather than complex hardware.

This diagram shows the potential problems caused by poor hybrid performance. Telos' all-digital approach reduces announcer mic distortion and speaker feedback while enabling natural sounding, two-way conversation on the air.

FEATURES AND BENEFITS

Switch Console

This desktop controller has provisions for line selection, conferencing, dialing, and a number of special features. Up to six telephone lines may be assigned to each of the two rows of line control buttons. The top row of LINE buttons assigns callers to the built-in hybrid and puts them "on-air." The bottom row assigns calls to a connected single-line telephone for screening. Each row has its own buttons for dropping a line or placing it on hold. Calls may be moved directly from row to row (effectively from screening to on-air) without being dropped or first placed on hold.

The Switch Console provided with the ONE-x-Six is the same one used in our larger systems. Therefore, buttons for lines not used by the ONE-x-Six are inactive. Telos also manufactures numerous modular panels designed to fit into popular models of broadcast audio consoles. These may be used to replace or supplement the desktop Switch Console.

Each Switch Console LINE button has two associated LEDs above it. A red, bar-shaped LED indicates telephone line status. A yellow, round LED above the LINE buttons shows which lines are being fed to the built-in hybrid.

From the tone pad, outgoing calls may be placed. A switch inside the ONE-x-Six determines whether dialing is tone or pulse.

Six special function buttons appear on the Switch Console:

NEXT

Selects the line that has been ringing in the longest. If no lines are ringing in, it selects the line on screened hold the longest.

BUSY ALL

With the first press of this button, all lines that are neither in use nor on hold are made busy. On the second press, busy lines are dropped. One or more lines may be programmed as "hot lines" and will not be affected by the BUSY ALL feature. This function is helpful in preventing callers from jamming your phone lines just prior to accepting calls for a contest.

FLASH/NEW OR AUTO-ANSWER

A dip switch inside the ONE-x-Six selects which of these features is controlled by the button. The FLASH/NEW function is primarily for use with PBXs or Centrex telephone lines that require hook flash to access features. The FLASH/NEW button can also be used for dropping a line, that is, to hang up a line and get dial tone back on the selected line without going through the usual OFF and LINE button press sequence. This button is useful for dropping a line when a wrong number is dialed or if many calls are to be made on the same line.

This button can alternately be used to toggle on and off the AUTO-ANSWER feature. The AUTO-

ANSWER feature automatically answers lines that ring in and places them on screened hold. Once on hold, the callers will hear the program-on-hold source. You have the option of keeping AUTO-ANSWER on or off at all times if you choose to have this button used for the FLASH/NEW function.

RECORD MODE

This button enables the operator to conveniently start a tape recorder. To ready the RECORD MODE, push the button once. The next time any LINE button is pressed, an output on the back of the ONE-x-Six will be activated to start a recording device.

RECORD STOP

When this button is pushed, a closure output on the back of the ONE-x-Six stops the recording device. You may choose to assign another function to this button and closure.

DELAY DUMP/USER BUTTON

This button activates an external profanity delay via a closure output on the back of the ONE-x-Six. You may choose to assign another function to this button and closure.

An assortment of LINE button legends are provided or you may easily create your own. Switch Consoles may be located up to 100' from the ONE-x-Six, from which it draws its power, without the use of a Local Power Supply. The Local Power Supply extends the operational distance to 250'.



SOME QUESTIONS ANSWERED

What is the advantage digital signal processing (DSP) brings to telephone interface equipment?

The primary advantage is vastly improved “trans-hybrid loss.” Trans-hybrid loss is the announcer’s voice signal (or send audio) that leaks through the hybrid to the output. Ideally, the output should consist of the caller audio only.

In a broadcast studio, the announcer audio is mixed at the console with the hybrid (caller) output to create the “on-air” mix. When you use a poor hybrid, its output includes a distorted, phase-shifted version of the announcer signal. When this “leakage” is combined with the clean announcer audio, a “hollow” or “tinny” sound is produced as some frequencies are more affected by phase cancellation than others. One good measure of hybrid performance is that the announcer’s voice sounds the same when the hybrid is on-air or inactive.

Are there any other problems caused by poor trans-hybrid loss?

Yes. Poor trans-hybrid loss can cause feedback when the caller must be heard on an open speaker in the studio. Also, in systems using multiple hybrids to conference several callers, poor trans-hybrid loss will cause a serious “singing” feedback, especially on low-level callers.

These problems result from the nature of phone lines, right?

You’ve got it. Hybrids must deal with complex and erratic phone line impedance characteristics across the phone line’s frequency range. Impedance variations are caused by nearly every piece of equipment and run of cable between your studio and the caller’s telephone. To cancel the send audio, primitive analog hybrids use simple resistor-capacitor “balancing networks” to attempt to match the impedance of the phone line. It is a rare phone line that has a smooth, unvarying characteristic, so analog hybrids are often hopelessly ineffective.

How does Telos’ digital processing hybrid work?

Telos digital hybrids use a very advanced convolutional adaptive filter concept to synthesize a transfer function for the balancing network. A feedback loop continuously adjusts the filter to conform to changing line impedances. In the hybrid built into the ONE-x-Six, an error signal is used to adjust the amplitude and phase cancellation signal at a large number of frequency points. The result is a very close match to the phone line impedance curve for optimum rejection.

Must I manually adjust the hybrid so that each call begins with optimum trans-hybrid loss?

The Telos ONE-x-Six performs all adjustment automatically and requires no “tweaking” once installed. When a LINE button is pushed on the Switch Console, a brief mute/adapt period (about 250ms) causes the system to adjust to the phone line before that call goes on the air. The caller hears a “noisy tone,” but the tone is not heard on the air because the output is muted during this time. This has the incidental benefit of removing the line-switching “clunk.” As the conversation proceeds, adaption continues, using the send audio as the driving signal.

Is there other processing that improves performance?

Our full digital approach also provides very smart gain control on both the announcer send signal and the caller signal. The input gain section uses an advanced adaptive gate scheme to compensate for widely varying levels without bringing up room noise. The output gain section is cross-coupled to the input section so that it will not compress up hybrid leakage. And the downward expander subtly reduces phone line noise while distinguishing and passing low level callers. Overall, the caller audio is clear and undistorted.

You mention an acoustic duck function. What is this?

Acoustic ducking, a function unique to Telos hybrids, significantly improves gain-before-feedback when the hybrid is used with an open speaker used to amplify the caller’s voice. It is a linear ducker in the send path that reduces gain dynamically when the caller talks. Because it is linear rather than on-off switching, it allows natural conversation without the negative effects of speakerphone-style hard reduction. It is also much shallower in its gain reduction than the usual switching and very fast.

A pitch-shifter also helps by preventing feedback from building up.

Why is Telos the preferred choice among the available digital telephone interface equipment?

The Telos ONE-x-Six is the result of years of development effort, field experience, and extensive testing. Telos’ unsurpassed experience, combined with a passionate and exclusive dedication to telephone interface technology, has paid off. We’ve found ways to “tweak” the adaptive process to achieve very fast nulling, stability of adjustment, and, of course, maximum trans-hybrid loss. No other equipment comes close.

By combining our advanced digital hybrid technology with a complete broadcast telephone system, the ONE-x-Six presents a flexible and complete talk show system at a very modest price.

The ONE-x-Six is impressive, but my requirements are for a larger system. Does Telos have any products that permit connection of more phone lines and placing more callers on the air?

We certainly do. Telos has designed and manufactures the widest range of complete systems for talk show and call-in programming. These “modular” systems allow you to choose from numerous hybrid and controller options.

Telos Systems and its dealers and representatives would be pleased to provide you with more information on a system configured just for you.



TECHNICAL DESCRIPTION

Overview

The Telos ONE-x-Six offers a complete solution to the screening, control, and selection of multiple telephone lines and callers. Communication between the rack mount unit and its peripheral Switch Console is via serial data over "skinny wire" using modular, six-conductor cables. The standard configuration includes one Switch Console, but an unlimited number of controllers can be accommodated.

System configuration

Telephone lines connect via standard RJ-11 jacks. The audio input is switchable for either microphone or line level. Two caller outputs are provided, one of which may be used as a second independent output or be switched to a mix of the input and caller signals.

Plugs are provided for two Switch Consoles. If additional controller surfaces are required, or if the distance between the controllers and the ONE-x-Six is great, our Local Power Supply is needed. The Local Power Supply can power two controllers and has a data-through port, so additional Local Power Supplies can be connected in series.

A jack on the back of the ONE-x-Six permits connection of a user-provided, standard single-line telephone for call screening. This jack may be "split" to accommodate multiple phone sets, but all phones will be connected to the same line as selected by the bottom row of LINE buttons on the Switch Console.

The serial connection is RS-232, IBM AT format. It provides full control and status monitoring for integration with an external computer. Telos' Call Screen Manager software is designed for both call screening and system control.

XLR connectors are provided for the program-on-hold and page signals. Program-on-hold is controlled by automatic gain control and its peak level is indicated by a front panel LED.

Integration with other telephone systems

Ideally, phone lines used with the ONE-x-Six should not be connected to another telephone system. We know that sometimes, however, this cannot be avoided.

A special loop-through feature with line current detection permits integration with many PBXs and electronic telephone systems. Line supervision (the ability of one system to prevent a line in use from being accessed by the other system) varies among electronic phone systems.

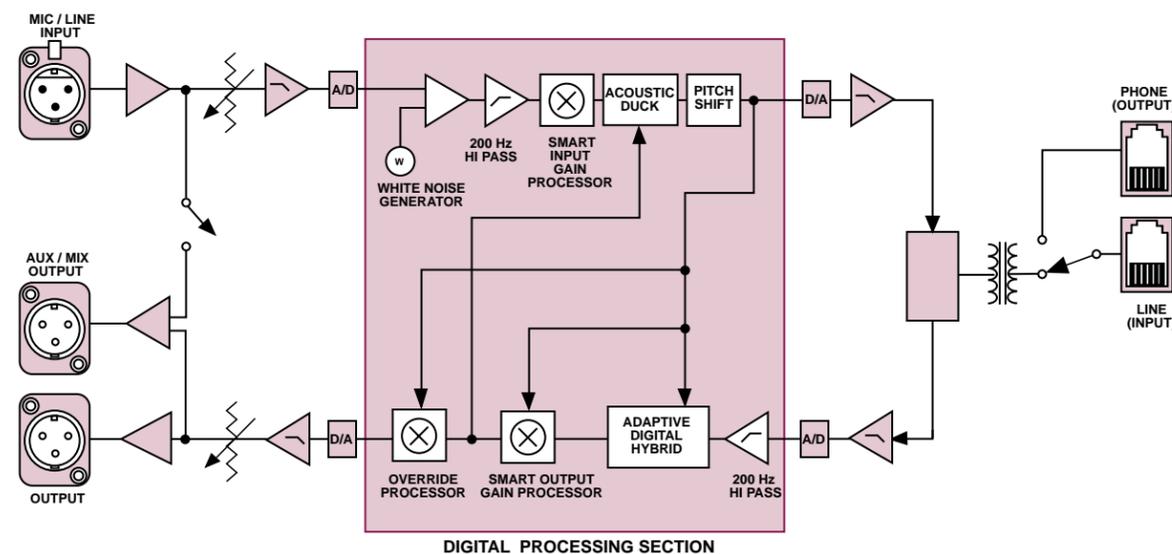
Some electronic phone systems have ports designed to connect standard single-line telephone sets. Since these ports appear as standard phone lines, they can be readily connected to the ONE-x-Six. When the ONE-x-Six is installed after other PBX equipment, audio quality may be degraded by that electronic phone system.

Conferencing

When conferencing callers, it is desirable to have one hybrid dedicated to each caller. This helps to ensure adequate caller-to-caller gain. While each caller may sound fine on-air, the callers may not hear each other well enough for reasonable conversation. In addition, more than two callers assigned to one hybrid may negatively affect the on-air audio.

While the ONE-x-Six has only one built-in hybrid, it permits conferencing of multiple callers. A second push of a LINE button after a caller has been placed on-air "locks" that caller into a conference mode.

That caller will not be dropped when another caller is selected by pressing another LINE button. Only when the conferenced caller's LINE button is pushed a third time can the line be released.



Using a second hybrid

The ONE-x-Six allows you to connect a second, external hybrid for conferencing. When a second hybrid is used, caller-to-caller gain is improved, reducing the likelihood that your conferenced callers will have problems hearing each other. For your second hybrid, we recommend our Telos ONE or Telos 100 Delta digital hybrid telephone interface.

When using two hybrids, you must have two mix-minuses. Also, for best operation, we strongly recommend feeding the outputs of the two hybrids to two different console inputs. This gives you complete control over the relative mix of the two callers and helps to avoid mix-minus problems.

There are three ways to install a second hybrid for use with the ONE-x-Six:

1. Connection to ONE-x-Six with control from Switch Console

The second hybrid is connected to the phone jack on the back of the ONE-x-Six normally used for the screener telephone. The bottom row of buttons of the Switch Console will select the lines to be routed to the external hybrid. The second hybrid may be turned on and off from the ONE-x-Six's remote connector by enabling an internal DIP switch.

When a second hybrid is connected to the ONE-x-Six in this manner, most caller screening capabilities are compromised. It is possible to work around this problem by using a single-line phone looped through the second hybrid and taking care not to accidentally put the caller on the air during screening. Alternately, the second hybrid's console fader can be put into cue mode for screening.

2. Loop through a single ONE-x-Six line

The second hybrid can be looped through one of the lines connected to the ONE-x-Six. This allows you to use all of your phone lines normally when only putting one caller on the air. When you want to conference a special guest, dial out on the line with the second hybrid, and then, instead of putting the guest on the air from the ONE-x-Six, use the second hybrid.

This method retains your screening capabilities, but you must provide a means of turning the second hybrid on and off.

3. Stand-alone second line

This has proven to be the most popular option. Use an additional phone line separate from the lines connected to your ONE-x-Six. This will allow you to install the hybrid as a separate "system." Use this phone line exclusively for guests and do not publish the phone number.

This method retains your screening capabilities, and you must make provisions for turning the second hybrid on and off.

Should the use of a second hybrid with the ONE-x-Six not meet your programming needs, Telos Systems offers several other multiline, multi-hybrid options. Contact us or your dealer or representative for details.

Call Screen Manager

Call Screen Manager is a recommended accessory for serious talk show programming. Using economical IBM-compatible PCs and peripherals, it complements the Telos ONE-x-Six by allowing the screener/director to provide the talent with information on each caller, send additional messages to the talent, and control the status of telephone lines. Telephone line and caller status are updated in real time to indicate callers who are ON-AIR, part of a conference, and on HOLD. Each line has a call timer and programmable duration alarm.

Call Screen Manager includes a caller information database module, Database Tools, to store and manipulate caller data. Built-in and custom reports can be used to analyze your caller information. Optional Remote Software allows two-way communications between your studio and talent located at a remote site via modem, enabling your talent to conduct his/her program from virtually anywhere.

■ Caller data and messages entered by the screener are clearly viewed on the talent's display.

■ Flash Messages and a Full Page Message may be sent from the screener to the talent with a single keystroke.

■ Caller information database stores data entered by the screener, along with date and time of call, hold duration, and call duration.

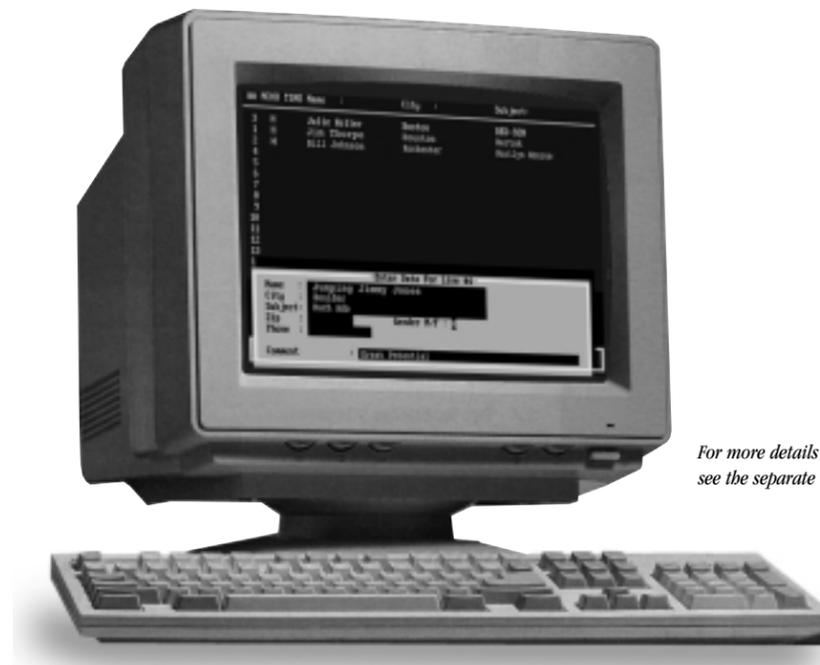
■ The Database Tools module allows modification of data fields and includes report and export features.

■ Multiple language support for worldwide use.

■ Call Screen Manager provides computer keyboard control of selected ONE-x-Six functions. This allows most critical screener functions to be accomplished from the keyboard.

■ Telos desktop Switch Console can control selected Call Screen Manager functions.

■ When using Remote Software, a Switch Console may be used at the remote PC for control of studio equipment.



For more details on Call Screen Manager, see the separate brochure.

TECHNICAL SPECIFICATIONS



Hybrid Section

Processor

True digital. Second generation Texas Instruments TMS320C25 processor. 8kHz sampling rate. Internal digital input and output gain processing, filtering.

Trans-Hybrid Loss

>40dB with pink noise or voice as test input, all dynamic enhancement processing switched off. With the override and output expander functions switched in, trans-hybrid loss is enhanced to >50dB.

Send Level to Phone Line

-10dBm average level. Maintained by internal digital AGC.

Send Audio Input

XLR female connector. Active balanced. Accommodates -24dBm to +12dBm levels in LINE mode; -68dBm to -35dBm in MIC mode. Front panel screwdriver level adjustment.

Caller Audio Output

XLR male connector. Active differential. Output levels to +14dBm depending on caller telephone line level and adjustment of front panel screwdriver level adjustment. Drives 600Ω .

Aux/Mix Output

XLR male connector. Active differential. In AUX mode, this output is an isolated second output. In MIX mode, this is a combined send and caller output. Input to Mix output: Unity gain. <0.04 % THD; +12dBm clip point.

Phone System Section

Processor

80188 processor running software written in the "C" language.

Music On Hold Input

XLR female connector. Active balanced. 10kΩ input impedance. -20 to +4dBu level. An AGC circuit maintains consistent levels to held callers for any input level within this range.

Communication Between Switch Console and Rack Mount Unit

9600 Baud RS-232 using six-conductor modular cable. Switch Console can be located up to 100' from the rack mount unit; 250' with the Local Power Supply installed.

RS-232 Port

1200 Baud using "AT" style DB-9 connector. Simple ASCII commands are used for communication in both directions.

System

Frequency Response (caller to output)

200 – 3400Hz, ±1dB.

Noise and Distortion (caller to output)

Distortion: Typical 0.4% THD+N, measured @ 1kHz at any level from -48dBm to -8dBm. Signal-to-Noise: >72dB referenced to 0dBm phone level.

Included Accessories

Manual with pull-out user instructions, 25' six-conductor modular cable for connection of Switch Console, and power cord.

Rack Mount Unit Power Supply

Universal, input switching operable from 85VAC to 250VAC, 50Hz or 60Hz. Power consumption 30 watts. Incorporates surge suppression and line voltage "dip" protection.

Rack Mount Unit Physical Dimensions

Standard rack mount, one rack unit high. 9 7/8" deep (23.8cm)

Switch Console Physical Dimensions

3 1/8" x 12 3/4" x 4 1/4"
8.1cm x 7.0cm x 10.8cm

Weight (rack mount unit and Switch Console

packaged in single carton)
6 pounds (15 pounds shipping weight)
2.7 kilograms (6.8 kilograms shipping weight)

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