

# SONIFEX

Telephone Hybrids

# Catalogue



## What Is A Telephone Hybrid?

Telephone hybrids, or telephone balance units (TBUs) provide the interface between professional audio equipment and the public telephone network. They provide protection for your equipment and the public telephone lines, allowing for varying line signals and line conditions. Automatically cancelling out the unwanted signal they also facilitate two-way communication down a single telephone line.

Each telephone hybrid has a telephone line connection, a handset connection and separate terminals for audio input and output from a broadcast mixer, or other professional audio source.

A large proportion of Sonifex hybrids are used in radio and television broadcasting applications for allowing external callers to be connected to the studio mixing console. Most of the other units are supplied to communication operations for allowing extremely effective conversion between 4-wire audio circuits and standard telephone lines.

A ringing detector can be used when you need to answer a call automatically, for instance, if a journalist files a report to a PC recorder over a telephone line, the call can be picked up after a set number of rings by the ringing detector. Both the HY-03 & DHY-03 have a built in ringing detector that is enabled by one of the configuration settings switches on the rear panel.

### Line Powered, Analogue, Digital or GSM or HD Voice?

Sonifex offer a few different hybrid units:

- The CM-TBU & CM-TLL line powered hybrids.
- The HY-03 analogue telephone hybrid.
- The DHY-03 DSP based telephone hybrid.

- The DHY-04 DSP based telephone hybrid.
- The DHY-04G DSP based GSM hybrid.
- The DHY-04HD DSP based HD Voice & GSM hybrid.

The extremely compact **CM-TBU** and **CM-TLL** units are portable and powered from the telephone line, providing a basic voice interface to a 4-wire circuit with separate level control of send and receive signals, useful for talkback applications.

The analogue **HY-03** hybrid is suitable for most general telephony applications and is often used in radio and TV stations, trading floors and conferencing centres. The HY-03 can be used for any application where a clean telephone signal is required and the line is not subject to signal delay.

The **DHY-03** offers near perfect performance, using DSP power to dramatically improve the unit's operation. The DHY-03 offers the features of the HY-03, but has some other benefits:

- Echo cancellation is possible and distortion of other mixed signals is greatly improved.
- Digital hybrids are more tolerant to fluctuating line conditions and are especially suitable for dealing with calls that have a slight signal delay, for example, satellite and conference calls.

The DHY-03 can recall signals from its memory buffer and allow for these delays without impairing performance.

The **DHY-04** is a redesign of the DHY-03 hybrid and adds Ethernet connectivity with a built-in web browser for configuration, control and dialling, combined AES/EBU digital and analogue audio inputs and front panel speed-dial buttons.

The **DHY-04G** uses a GSM SIM card to connect callers on the 2G/GSM cellular network to a radio/TV mixing console connected to the DHY-04G 4 wire input and output.

The **DHY-04HD** uses a 3G SIM card to connect callers on the 3G cellular networks using HD Voice wideband audio to provide a high quality audio call. This is ideal for broadcasters and journalists providing a frequency response up to 7kHz (twice that of a normal GSM or POTS connection). It converts 3G or GSM calls to the 4 wire audio signal to and from a connected mixing console.

**Note:** The CM-TBU, CM-TLL, HY-03, DHY-03 and DHY-04 products are operating on analogue telephone lines, not ISDN or IP digital lines. The "analogue" and "digital" refer to the processing used in the units.



## CM-TBU Line Powered Telephone Balance Unit



The CM-TBU line-powered telephone balance unit is compatible with all analogue direct exchange lines and provides a 4-wire communications system to interface with the telephone network.

The high degree of separation between send and receive signals makes it suitable for use in telephone IFB (interrupted foldback) applications and the high drive capacity at the 4-wire output enables a presenter's earpiece to be connected directly to the unit without an external amplifier.

This extremely compact unit is powered from the telephone line and provides an interface to a 4-wire circuit with separate level control of send and receive signals. Optimum rejection of the input signal on the

4-wire output is achieved in a bridge circuit by adjusting three elements (NULL, R-BAL and C-BAL) via potentiometers which simulate the complex line impedance. This can be used to compensate for local line variations or to adapt to the telephone systems of other countries, where line characteristics may differ. Optimization of the sidetone rejection does not involve the use of any test equipment and can be easily carried out while the system is in use.

Although the signal level being sent to the line can be manually adjusted using the 'SEND LEVEL' control over a wide range, the level control is followed by a limiter that prevents the telephone line signal level becoming overloaded or distorted. The limiter drives a



**Category:** Line Powered Telephone Hybrids.

**Product Function:** Provides separation between send and receive signals on an analogue telephone network and provides professional level balanced input & output signals.

**Typical Applications:** Talkback applications, e.g. to get cue feed to a remote presenter from a distant studio, hospital/community radio talkshows, house of worship remote listen & contribution to service.

**Features:**

- Isolated, full-duplex 4-wire interface to

direct non-digital telephone exchange lines.

- Line powered, requiring no battery or external power.
- Simple optimization of sidetone rejection with any country's telephone system.
- LEDs indicating 'Ring', 'Line Hold' and 'Limit' conditions.
- Input level control with line-sensing limiter and limit indicator.
- High drive output with level control for direct feed to presenter's earpiece, etc.
- Loop-through RJ11 line sockets provide universal connection to line and telephone set.
- Connection to the telephone set is maintained while the unit is in use.
- Small, rugged aluminium case.

'LIMIT' LED to indicate the onset of limiting.

Although the output stage can drive a presenter's earpiece in a telephone IFB application, the 'RECEIVE LEVEL' control may not be accessible to the presenter, who is normally situated some distance from the unit. The presenter may then require a local control of the earpiece signal level. The CM-TBU can be used to supply the correct signal level to a suitable battery powered earpiece belt-pack unit.

To enable communication between the 4-wire circuit and the telephone network, once the 4-wire and telephone line cable connections are made to the unit, the 'LINE CONNECT' switch can be pressed to power the unit from the line. This is indicated

by the 'ON' LED, and can either be done after an outgoing call has been dialled on a telephone set connected to the unit, or to answer an incoming call after the 'RING' LED is seen to flash. Note that a telephone set is not required for incoming calls unless an audible ring is required. If the sidetone level at the 4-wire output is found to be excessive, the outgoing signal level can be reduced using the 'SEND LEVEL' control or the balance controls can be adjusted to minimize it.

The unit is supplied with a connector and cable kit that enables connections to be made to both UK Telecom or the universal RJ11 sockets used in most telephone networks around the world.



## Specification For CM-TBU

### 4-Wire Input

Input Impedance:	10kΩ, transformer coupled
Input Connector:	3 pin XLR female connector
Input Level Range:	-12dBu to +4dBu before limiting when connected to an average line

### 4-Wire Output

Output Impedance:	150Ω, transformer coupled
Output Connector:	3 pin XLR male connector
Output Level Range:	-6dBu to +6dBu, for average line level

Sidetone Rejection:	30dB to 40dB average, depending on line characteristics
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2-Wire Off Hook Voltage:	6V minimum
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2 Wire Connectors:	RJ11 socket - line RJ11 socket - handset
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### Front Panel Operational Controls

Line Connect:	Push button with indicator
Send Level:	Small rotary control
Receive Level:	Large rotary control
Null Balance:	Recessed preset potentiometer
R Balance:	Recessed preset potentiometer
C Balance:	Recessed preset potentiometer
Ring LED:	Indicates incoming ringing
Limit LED:	Indicates limiter active
On LED:	Indicates connection to the telephone line

### Equipment Type

CM-TBU	Line powered telephone balance unit
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### Physical Specification

Dimensions (Raw):	7.7cm (W) x 8.3cm (D) x 4.2cm (H) 3.0" (W) x 3.3" (D) x 1.7" (H)
Dimensions (Boxed):	22.9cm (W) x 12.7cm (D) x 7.6cm (H) 9.0" (W) x 5.0" (D) x 3.0" (H)
Weight:	Nett: 0.25kg Gross: 0.75kg Nett: 0.60lbs Gross: 1.7lbs

## CM-TLL Line Powered Telephone Line Listen Unit



**Category:** Line Powered Telephone Hybrids.

**Product Function:** Provides a professional balanced audio output from the PSTN telephone line.

**Typical Applications:** Remote caller feed into seminars, remote cue & feedback source.

### Features:

- Audio interface to direct analogue exchange lines - receive calls with electrical isolation from the line.
- Line powered, requiring no battery or external power.
- LEDs indicating 'Ring' and 'On Hold' conditions.
- Loop-through line sockets provide in-line connection with existing telephone.
- Existing telephone remains connected when the unit is in use.
- Line connections to British or International sockets via supplied cable kit.
- Small, rugged aluminium case with XLR3 male 4-wire connector.



The CM-TLL provides a low-loss interface to receive audio from a telephone line. The line-powered unit is compatible with all analogue direct exchange lines and includes an LED indication of incoming calls.

The unit is intended to be used with an earpiece amplifier to receive an audio feed by telephone from a studio.

The line and telephone set are connected to the unit via the RJ11 connectors in order to make an outgoing call. A telephone may not be required if calls are only incoming, because telephone line ringing is indicated by a flashing LED built into the unit. In either case, the 'LINE CONNECT' switch is pressed to make the line connection. The 'ON' LED indicates that the unit is powered and that audio is routed to the line via the XLR plug.

## Specification For CM-TLL

### 4-Wire Output

Output Impedance:	150Ω, transformer coupled
Output Connector:	3 pin XLR male connector
Output Level:	Typically 0dBu for average line level

### 2-Wire

Off Hook Voltage:	6V minimum
2 Wire Connectors:	RJ11 socket - line RJ11 socket - handset

### Front Panel Operational Controls

Line Connect:	Push button with indicator
Ring LED:	Indicates incoming ringing
On LED:	Indicates connection to the telephone line

### Equipment Type

CM-TLL:	Line powered telephone line listen unit
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### Physical Specification

Dimensions (Raw):	7.7cm (W) x 8.3cm (D) x 4.2cm (H) 3.0" (W) x 3.3" (D) x 1.7" (H)
Dimensions (Boxed):	22.9cm (W) x 12.7cm (D) x 7.6cm (H) 9.0" (W) x 5.0" (D) x 3.0" (H)
Weight:	Nett: 0.20kg Gross: 0.70kg Nett: 0.50lbs Gross: 1.6lbs

# HY-03

## HY-03, HY-03S & HY-03T Analogue Telephone Hybrids



**Category:** Analogue Telephone Hybrids.

**Product Function:** Provides separation between send and receive signals on an analogue telephone network and provides professional level balanced input & output signals.

**Typical Applications:** Radio & TV station talk shows, telephony interface to the mixer.

**Features:**

- Fully automatic - adapts to varying line conditions and has automatic signal limiting.
- Local and remote line hold switching - calls can be remotely switched through a mixing console.
- Momentary or permanent latching remotes can be enabled.
- Balanced mic/line input - 10kΩ balanced input selectable for 0dBu clean feed line, or microphone level with adjustable gain.
- Balanced output - 0dBu low impedance

balanced output, with output gain adjustment.

- Mixed output - the output can be a mix of the caller and mic/line input signals for recording both sides of the telephone conversation.
- Integrated ring detector - automatic call answering after a pre-determined number of rings.
- Fitted with K-break disconnect detection as standard with an option for dial-tone disconnect using the optional HY-03DTD board. The HY-03DTD board

can be configured to disconnect on recognizing the dial tone used in a specific country.

- Line limiter, bandpass filter and output noise gate with preset threshold providing low distortion crystal clear audio.
- 28dB typical line balance rejection.
- Built in power supply with switchable 115V, or 230V, mains input.
- BAPT approval compliant with European PTT specifications.

The analogue HY-03 telephone hybrid sets the standard as an excellent value, high quality telephone hybrid.

The analogue HY-03 hybrid is suitable for most general telephony applications and is often used in radio and TV stations, trading floors and conferencing centres.

The HY-03 can be used for any application where a clean telephone signal is required and the line is not subject to signal delay.



HY-03 Single Free-Standing Automatic Analogue TBU - Front & Rear.

### Which Format Is Most Suitable ?

The HY-03 analogue hybrids are available in three models :

- HY-03 Single free-standing automatic analogue TBU.
- HY-03S Single 19" rack mounted automatic analogue TBU with ringing detector.
- HY-03T Twin 19" rack mounted automatic analogue TBU.

HY-03S Single Rackmount Automatic Analogue TBU -- Front & Rear.



HY-03T Twin Rackmount Automatic Analogue TBU -- Front & Rear.



### Specification For HY-03

Audio Specification	
Input Impedance - Line Mode (Clean Feed):	10k $\Omega$ balanced 0dB
Input Impedance - Microphone Mode:	200 $\Omega$ balanced
Clean Feed Limiting Input:	+4dBu
Microphone Level Range:	From 74dB to 40dB adjusted by preset pot
Bandwidth to Telephone Line:	250Hz - 4kHz, -3dB ref 1kHz
Telephone Line Impedance:	Nominally 600 $\Omega$
Telephone Line Impedance Range:	300 $\Omega$ to 1500 $\Omega$
Output Impedance:	50 $\Omega$ balanced floating 0dBu
Output Level Range:	+8dB to -14dB adjusted by preset pot
Rejection Ratio:	45dB on 1kHz tone, typically 28dB on complex waveforms, reference peak level of 0dB
Ring Detector Sensitivity:	1 ring to 6 rings
Power:	230V 50Hz, or 115V 60Hz. 6W for HY-03.

### Connections

Mic/Line Input:	XLR 3 pin female with push button mic/line selection
Line Output:	XLR 3 pin male
Telephone Line:	RJ11 6/4 socket
Telephone Handset/Instrument:	RJ11 6/4 socket
Remotes:	9-way D-type socket
Power:	IEC mains (CEE22)

Each unit is supplied with:  
 1 x RJ11 to RJ11 telephone line lead  
 1 x RJ11 to BT plug telephone line lead  
 1 x BT handset socket to RJ11 plug adapter,  
 1 x IEC mains lead fitted with moulded mains plug and 1 x handbook.

### Accessories

Order Code	Description
HY-03DTD	Dial tone detect add-on board
HY-03CON	Front panel conversion kit, HY-03S 19" (48cm) rack-mount front to HY-03 free standing
HY-03SCON	Front panel conversion kit, HY-03 free standing to HY-03S 19" (48cm) rack-mount front
HY-03TCON	Front panel conversion kit, HY-03 or HY-03S, to HY-03T 19" (49cm) rack-mount front

Order Code	Description	Height	Width	Depth* Weight	Total Nett Weight	Total Gross
HY-03	Automatic analogue TBU, free standing	4.5cm 1.8"	21.8cm 8.6"	17.5cm 7"	1.25kg 2.75lbs	2.0kg 4.4lbs
HY-03S	Automatic analogue TBU, 19" rack mounted	4.5cm (1U) 1.8" (1U)	48.3cm (19" rack width)	17.5cm 7"	1.30kg 2.9lbs	2.1kg 4.6lbs
HY-03T	Twin automatic analogue TBU, 19" rack mounted	4.5cm (1U) 1.8" (1U)	48.3cm (19" rack width)	17.5cm 7"	2.60kg 5.7lbs	4.0kg 8.8lbs

\*Depth is measured from the front to the end of the connectors fitted to the back of the unit. Note: If you are ordering the HY-03 for use in the USA, add the word "US" after the product code. The HY-03 uses different circuitry for US telephone exchanges.

# DHY-03

## DHY-03, DHY-03S & DHY-03T Digital Telephone Hybrids



**Category:** Digital Telephone Hybrids.

**Product Function:** Provides separation between send and receive signals on an analogue telephone network, provides professional level balanced input & output signals and has echo cancellation.

**Typical Applications:** Radio & TV station talk shows, telephony interface to the mixer.

**Features:**

- Fully automatic - adapts to varying line conditions and has automatic signal limiting.
- Fully adaptive echo cancellation to 127msec - default is 24msec.
- 76dB typical line balance rejection offering superb performance and crystal clear audio.
- Front panel input and output gain controls.
- Front panel LED metering of receive and send signals.
- Built-in conferencing for 2 hybrids, so that a single telco channel on a mixing desk can receive 2 calls.

- Integrated ring detector - automatic call answering after a pre-determined number of rings.
- Automatic call disconnection. Fitted with K-break, line polarity reversal and dial tone disconnect detection, defined by the country selection.
- Automatic ducking facility allows the talent to 'shout-down', or talk over, a caller by reducing the gain of the caller's signal if it goes above a certain level.
- Local and remote line hold switching - calls can be remotely switched through a mixing console.
- Line hold/release button to control line hold circuit, illuminates to indicate the status of the line and flashes to show ring status.
- DTMF tone recognition allowing a opto-isolated GPI output to be made on receipt of selected DTMF tones, e.g. for starting a studio automation recorder automatically to record a remote telephone interview.
- International operation with built-in configurable settings for each country. Country selection allows the unit to provide line impedance and a simulation circuit to match the country.
- RS232 serial port for remote control of the TBU, DTMF tone dialling and firmware upgrades to add new country settings.
- Remote port distributes the remote line connect switch and tally output, a momentary/latch selector and the DTMF detect output.
- The remote line connect switch can be either momentary or latching in its action.
- Balanced mic/line input - 10k balanced input selectable for 0dBu clean feed line, or microphone level with adjustable gain.
- Balanced output - 0dBu low impedance balanced output, with output gain settings.
- Record output - the conferencing output can be set via a jumper to give a mix of the caller and mic/line input signals for recording both sides of the telephone conversation.
- Line limiter, bandpass filter and output noise gate with preset threshold providing low distortion audio.
- Built in universal power supply between 90V AC and 250V AC, 47-63Hz, IEC mains input.
- ETSI approval compliant with European PTT specifications.

The digital DHY-03 telephone hybrid is probably the best performing digital hybrid in the world, with simply stunning line balance rejection figures. For the best sounding audio calls you're likely to hear, you should specify the DHY-03.

The DHY-03 offers near perfect performance, using DSP power to dramatically improve the unit's operation.

The DHY-03 offers the features of the HY-03, but has some other benefits: Echo cancellation is possible and distortion of other mixed signals is greatly improved.

Digital hybrids are more tolerant to fluctuating line conditions and are especially suitable for dealing with calls that have a slight signal delay, for example, satellite and conference calls. The DHY-03 can recall signals from its memory buffer and allow for these delays without impairing performance.



DHY-03 Single Free Standing Automatic Digital TBU - Front & Rear.



DHY-03S Single Rackmount Automatic Digital TBU - Front & Rear.



DHY-03T Twin Rackmount Automatic Digital TBU - Front & Rear.



**Which Format Is Most Suitable ?**

The DHY-03 digital hybrids are available in three models :

- DHY-03 Single free-standing automatic digital TBU.
- DHY-03S Single 19" rack mounted automatic digital TBU.
- DHY-03T Twin 19" rack mounted automatic digital TBU.





DHY-03S Single Rackmount Automatic Digital TBU - Front.

### Specification For DHY-03

#### Audio Specification

Input Impedance - Line Mode (Clean Feed):	10kΩ balanced 0dB
Input Impedance - Conferencing:	10kΩ balanced 0dB (not for DHY-03EC)
Input Impedance - Microphone Mode:	2kΩ balanced (not for DHY-03EC)
Input Level Gain Range:	+6dB, 0dB, and -6dB adjusted by 3-position front panel switch, +10dB jumper
Microphone Level Gain Preset:	From 65dB to 35dB (not for DHY-03EC)
Maximum Input Levels:	Line +26dBu, mic -24dBu
Clean Feed Limiting Input:	-4dBu for CTR21 setting, other values available *
Bandwidth to Telephone Line:	250Hz - 4kHz, -3dB ref 1kHz
Telephone Line Impedance:	600Ω, 900Ω plus 14 other complex impedance circuits *
Output Impedance - Line Out:	50Ω balanced floating 0dBu
Output Impedance - Conference/Record:	50Ω balanced floating 0dBu
Output Level Gain Range:	+6dB, 0dB, and -6dB adjusted by 3-position front panel switch
Rejection Ratio:	76dB on tones or complex waveforms, reference peak level of 0dB

Ring Detector Sensitivity:	Off, 2, 4 or 6 rings
Power to DHY-03, S & T:	Universal 12Ω power supply: 90 to 250V AC; 47-63Hz; fused 1A
Power to DHY-03EC:	±15 V DC @ 160mA per rail or regulated +5V DC @ 600mA

\* These values are dependent on the actual country setting selected on the DHY-03

#### Connections

Mic/Line Input:	XLR 3 pin female, with push-button mic/line selection
Line Output:	XLR 3 pin male
Telephone Line:	RJ11 6/4 socket
Telephone Handset/Instrument:	RJ11 6/4 socket
Conferencing or Record Audio:	RJ45 socket
Remotes:	9-way D-type socket
RS232 Serial:	9-way D-type socket
Power:	IEC mains (CEE22)
Connections for Eurocard:	64 pin DIN 41612 male (plug)
Each DHY-03, S & T unit is supplied with: 1 x RJ11 to RJ11 telephone line lead 1 x RJ11 to BT plug telephone line lead 1 x BT handset socket to RJ11 plug adapter 1 x IEC mains lead fitted with moulded mains plug 1 x handbook and warranty card.	

#### Accessories

Order Code	Description
DHY-03CON	Front panel conversion kit, DHY-03S to DHY-03
DHY-03SCON	Front panel conversion kit, DHY-03 free standing to DHY-03S 19" (48cm) rack-mount front
DHY-03TCON	Front panel conversion kit, DHY-03 or DHY-03S, to DHY-03T 19" (48cm) rack-mount front
DHY-03CONF	Conference cable to connect 2 x DHY-03 units
DHY-03RLY	Latching handset relay option for DHY-03, S and T (included in current models).

#### Physical Specification

Order Code	Description	Height	Width	Depth* Weight	Total Nett Weight	Total Gross Weight
DHY-03	Automatic digital TBU, free standing	4.5cm 1.8"	21.8cm 8.6"	17.5cm 6.9"	1.4kg 3lbs	2.2kg 4.8lbs
DHY-03S	Automatic digital TBU, 19" (48cm) rack mounted	4.5cm (1U) 1.8" (1U)	48.3cm (19" rack width)	17.5cm 6.9"	1.45kg 3.2lbs	2.3kg 5lbs
DHY-03T	Twin automatic digital TBU, 19" (48cm) rack mounted	4.5cm (1U) 1.8" (1U)	48.3cm (19" rack width)	17.5cm 6.9"	2.80kg 6.2lbs	4.4kg 9.7lbs
DHY-03EC	Automatic digital TBU with ringing detector Eurocard model (PCB 10x16cm)	12.9cm (3U) 5" (3U)	4.0cm (8E) 1.6" (8E)	19.0cm 7.5"	150g 0.3lbs	500g 1.1lbs

\*Depth is measured from the front to the end of the connectors fitted to the back of the unit.



SCI Dialpad Home Page.



SCI Disconnect Method Settings Page.

## DHY-03EC Automatic Digital Telephone Balance Unit Eurocard



**Category:** Digital Telephone Hybrids.

**Product Function:** Provides separation between send and receive signals on an analogue telephone network, provides professional level balanced input & output signals and has echo cancellation.

**Typical Applications:** Radio & TV station talk shows, telephony interface to the mixer.

**Features:**

- Eurocard format to get many cards into a small rackspace.
- Fully automatic - adapts to varying line conditions and has automatic signal limiting.
- Fully adaptive echo cancellation to 127msec - default is 24msec.
- 76dB typical line balance rejection offering superb performance and crystal clear audio.
- Front panel input and output gain controls.
- Integrated ring detector - automatic call answering after a pre-determined number of rings.
- Automatic call disconnection.

The DHY-03EC eurocard single digital telephone hybrid uses the same technology as the DHY-03 but is based in a card-style format for installation in a eurocard rack frame, or in certain broadcast mixers. Eurocards are supplied without a power supply, or casing, and are therefore significantly cheaper than the other units. It is pin compatible with the older DHY-02EC eurocard, but has the outstanding performance and most of the features of the DHY-03, with a few differences:

- The analogue input is line level only, though the 10dB professional/ consumer jumper is retained.
- There is no conferencing facility and consequently no record output option.
- The level meters are 2 tricolour LEDs.
- The level switches are now onboard 3 way jumpers.
- The remote outputs are connected via slide switches which means that the output signal can be either +5V, +15V or pull down to ground.
- The handset is connected to the telephone line via a divert relay.



*DHY-03EC - Automatic Digital Telephone Balance Unit Eurocard.*

## DHY-04 Telephone Hybrid

# DHY-04 Single Automatic Digital TBU, AES/EBU & Analogue I/O With Ethernet



**Category:** Digital Telephone Hybrids.

**Product Function:** Provides separation between send and receive signals on an analogue telephone network, provides professional level balanced input & output signals and has echo cancellation.

**Typical Applications:** Radio & TV station talk shows, telephony interface to the mixer.

**Features:**

- Fully automatic - adapts to varying line conditions and has automatic signal limiting.
- Fully adaptive echo cancellation to 127msec - default is 24msec.
- 70dB typical line balance rejection offering superb performance and crystal clear audio.
- Front panel input and output gain controls.
- Front panel LED metering of receive and send signals.
- Built-in conferencing for 2 hybrids, so that a single telco channel on a mixing desk can receive 2 calls.
- Integrated ring detector - automatic

- call answering after a pre-determined number of rings.
- Automatic call disconnection. Fitted with K-break, line polarity reversal and dial tone disconnect detection, defined by the country selection.
- Automatic ducking facility allows the talent to 'shout-down', or talk over, a caller by reducing the gain of the caller's signal if it goes above a certain level.
- Local and remote line hold switching - calls can be remotely switched through a mixing console.
- Line hold/release button to control line hold circuit, illuminates to indicate the status of the line and flashes to show ring status.
- DTMF tone recognition allowing a opto-isolated GPI output to be made on receipt of selected DTMF tones, e.g. for starting a studio automation recorder automatically to record a remote telephone interview.
- International operation with built-in configurable settings for each country.
- Country selection allows the unit to provide line impedance and a simulation circuit to match the country.
- RS232 serial port for remote control of the TBU & DTMF tone dialling.
- Remote port distributes the remote

- line connect switch and tally output, a momentary/latch selector and the DTMF detect output.
- The remote line connect switch can be either momentary or latching in its action.
- Balanced mic/line input - 10k balanced input selectable for 0dBu clean feed line, or microphone level with adjustable gain.
- Balanced output - 0dBu low impedance balanced output, with output gain settings.
- Record output - the conferencing output

- can be set via a jumper to give a mix of the caller and mic/line input signals for recording both sides of the telephone conversation.
- Line limiter, bandpass filter and output noise gate with preset threshold providing low distortion audio.
- Built in universal power supply between 90V AC and 250V AC, 47-63Hz, IEC mains input.
- ETSI approval compliant with European PTT specifications.



The DHY-04 Front & Rear Panels.

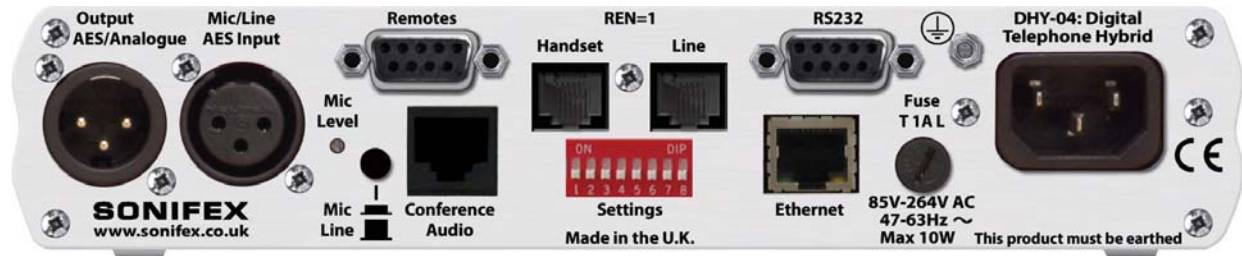
## The Best Telephone Hybrid in the World Just Got Better!

The DHY-04 telephone hybrid is an enhanced redesign of the DHY-03, the best performing telephone hybrid in the world. It now has auto-sensing combined analogue and AES/EBU inputs and outputs, front panel speed dial buttons, together with an Ethernet interface to allow web browser access to the configuration and internal settings. All whilst still retaining stunning line balance rejection figures. For the best sounding audio calls you're likely to hear, you should specify the DHY-04. Key new features of the unit include:

- Auto-sensing combined analogue or AES/EBU XLR input.
- AES/EBU sample rates up to 24 bit/96kHz accepted.
- Configurable analogue or AES/EBU XLR output.
- Ethernet port for remote configuration via web browser GUI.
- Remote dialling and line hold control via Ethernet.
- Ethernet network interface can generate SNMP Traps for SNMP management systems.
- DTMF dial tone recognition for reporter remote access - a journalist can dial into the unit which can recognise a pre-programmed DTMF numeric password to automatically connect the journalist on-air.
- Four front panel speed-dial buttons for dialling internally preset phone numbers.
- Front panel Redial button for redialling the last number.



The DHY-04 Front Panel.



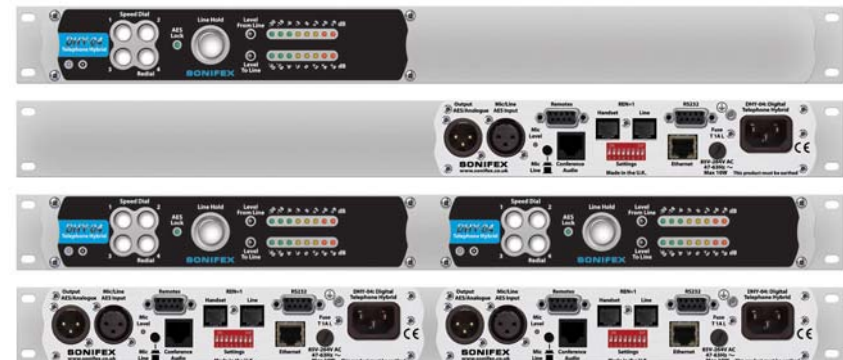
The DHY-04 Rear Panel.

The DHY-04S Front Panel.

The DHY-04S Rear Panel.

The DHY-04T Front Panel.

The DHY-04T Rear Panel.



# DHY-04G GSM Hybrid

## DHY-04G Single Automatic GSM Hybrid, AES/EBU & Analogue I/O With Ethernet



**Category:** Digital Telephone Hybrids.

**Product Function:** Provides separation between send and receive signals on a 2G/GSM network, provides professional level balanced input & output signals and has echo cancellation.

**Typical Applications:** Radio & TV station outside broadcast vehicles for talk shows, telephony interface to the mixer. Backup hybrid to cover failure of main landline.

**Features:**

- Quad-Band EGSM 850 / 900 / 1800 / 1900MHz.
- Rear panel 2G/GSM SIM card insertion.
- Ethernet web server control and configuration.
- Front panel speed dial buttons with redial.
- Signal strength LED display.
- LEDs for SIM enabled and GSM network availability.
- Automatic operation.
- Combined AES/EBU and analogue input and output.

A new addition to the DHY-04 range is the ability for the DHY-04G version to be used on a GSM cellular (mobile) phone network instead of a telephone (POTS) line. The DHY-04G can accept a SIM card in the rear panel slot and by connecting a suitable GSM antenna, the DHY-04G can receive and make high quality broadcast calls over the cellular network, converting the GSM call to the 4 wire audio signal to and from a connected mixing console. The GSM module used in the DHY-04G is quad-band GSM, so it can take and make calls on any 2G network.

Ideal for studios in remote locations, for OB vans and trucks on the move, and in emergency situations where a telephone landline can't be guaranteed, the DHY-04G offers outstanding performance.

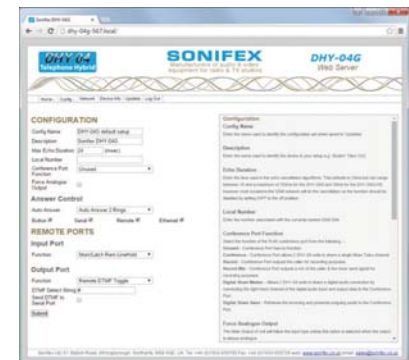
The DHY-04G has all features of the DHY-04 (read cellphone/mobile features instead of telephony features in the listed bullet point specification) together with some additional front panel indicators. There are two LEDs, one for SIM enabled and one for GSM Network availability. Additionally there is a push button which allows the GSM signal level to be displayed on the meter LEDs.



The DHY-04G Front & Rear Panels.



DHY-04G Home Page.



DHY-04G Configuration Page.





The DHY-04G Front Panel.



The DHY-04G Rear Panel.

**Which Format Is Most Suitable ?**

The DHY-04G GSM hybrids are available in three models :

- DHY-04G Single free-standing GSM TBU.
- DHY-04GS Single 19" rack mounted GSM TBU.
- DHY-04GT Twin 19" rack mounted GSM TBU.

The DHY-04GS Front Panel.



The DHY-04GS Rear Panel.



The DHY-04GT Front Panel.



The DHY-04GT Rear Panel.



**DHY-04HD**  
HD Voice Hybrid

## DHY-04HD Single Automatic HD Voice & GSM Hybrid, AES/EBU & Analogue I/O With Ethernet



**Category:** Digital Telephone Hybrids.

**Product Function:** Provides separation between send and receive signals on a 2G/GSM network, provides professional level balanced input & output signals and has echo cancellation.

**Typical Applications:** Radio & TV station outside broadcast vehicles for talk shows, telephony interface to the mixer. Backup hybrid to cover failure of main landline.

**Features:**

- Five band UMTS/HSPA+850 / 900 / 1800 / 1900 / 2100MHz.
- Rear panel 2G GSM or 3G SIM card insertion.
- Ethernet web server control and configuration.
- Front panel speed-dial buttons with redial.
- Signal strength LED display.
- LEDs for SIM enabled and GSM network availability.
- Automatic operation.
- Combined AES/EBU and analogue input and output.



The DHY-04HD Front & Rear Panels.

The DHY-04HD HD Voice Hybrid is used on a 3G or GSM cellular (mobile) phone network instead of a telephone (POTS) line. The DHY-04HD can accept a SIM card in the rear panel slot and by connecting a suitable GSM antenna, it can receive and make high quality broadcast calls over the cellular network, converting the 3G or GSM call to the 4 wire audio signal to and from a connected mixing console. The module used in the DHY-04HD is quad-band GSM and 5 band UMTS/HSPA+, so it can take and make calls on any 2G GSM, or 3G network.

It is ideal for studios in remote locations, for OB vans and trucks on the move, and in emergency situations where a telephone landline can't be guaranteed, the DHY-04HD offers outstanding performance.

The DHY-04HD has all features of the DHY-04 together with some additional front panel indicators. There are two LEDs, one for SIM enabled and one for GSM Network availability. Additionally

there is a push button which allows the mobile signal level to be displayed on the meter LEDs.

**HD Voice:**

HD Voice uses a coding system (also known as WB-AMR) for audio data that provides a significant enhancement on the quality of cellular phone calls. It is ideal for broadcasters and journalists providing a frequency response up to 7kHz (twice that of a normal GSM or POTS connection).

The use of HD Voice is dependent on 3 criteria:

1. The method has to be supported by the network, (and this may be limited by your contract), and when different networks are involved in the call, the interoperability between the networks.
2. The actual equipment used by both ends of the call must be HD Voice compatible. Both these requirements will be established on call connection, which leads to the third criteria.



The DHY-04HD Front Panel.



The DHY-04HD Rear Panel.

**Which Format Is Most Suitable ?**

The DHY-04HD HD Voice hybrids are available in three models :

- DHY-04HD Single free-standing HD Voice Hybrid.
- DHY-04HDS Single 19" rack mounted HD Voice Hybrid.
- DHY-04HDT Twin 19" rack mounted HD Voice Hybrid.

3. The signal quality can vary during the call. Normally the hybrid will be used in a fixed location (even OB trucks are normally stationary), so the position of the antenna can be refined for best signal quality. However the far end may be from a cellular phone, so may vary in quality and which can lead to dynamic bandwidth changes during a call. It is mostly true that network providers will only handle HD Voice on 3G networks though, in theory, it should also be compatible with enhanced 2G networks.

The DHY-04HDS Front Panel.



The DHY-04HDS Rear Panel.



The DHY-04HDT Front Panel.



The DHY-04HDT Rear Panel.





Specification For DHY-04, DHY-04G & DHY-04HD

Audio Specification Analogue Audio I/O	DHY-04	DHY-04G	DHY-04HD
Input Impedance - Line Mode (Clean Feed): 10kΩ balanced 0dB	Yes	Yes	Yes
Input Impedance - Conferencing: 10kΩ balanced 0dB	Yes	Yes	Yes
Input Impedance - Microphone Mode: 2kΩ balanced	Yes	Yes	Yes
Input Level Gain Range: +6dB, 0dB, and -6dB adjusted by 3-position front panel switch, +10dB jumper	Yes	Yes	Yes
Microphone Level Gain Preset: From 65dB to 35dB	Yes	Yes	Yes
Maximum Input Levels: Line +26dBu, mic -24dBu	Yes	Yes	Yes
Clean Feed Limiting Input: -4dBu for CTR21 setting, other values available *	Yes	Yes	Yes
Output Impedance - Line Out: 50Ω balanced floating 0dBu	Yes	Yes	Yes
Output Impedance - Conference/Record: 50Ω balanced floating 0dBu	Yes	Yes	Yes
Output Level Gain Range: +6dB, 0dB, and -6dB adjusted by 3-position front panel switch	Yes	Yes	Yes
<b>Audio Specification Digital Audio I/O</b>			
Input Impedance: 110Ω ±20% balanced	Yes	Yes	Yes
Output Impedance: 110Ω ±20% balanced	Yes	Yes	Yes
Sample Frequency Range: 30 - 100kHz (i.e. including 32kHz, 44.1kHz, 48kHz, 64kHz, 88.2kHz & 96kHz)	Yes	Yes	Yes
Signal Level: 2V/7V peak to peak min/max	Yes	Yes	Yes
Analogue Input Level for Full Scale Digits: +18dBu	Yes	Yes	Yes
Maximum Input Level: 0dBFS but internally limited to -6dBFS	Yes	Yes	Yes
Maximum Output Level: -6dBFS	Yes	Yes	Yes
<b>Telephone Line</b>			
Bandwidth to Telephone Line: 250Hz - 4kHz, -3dB ref 1kHz	Yes	No	No
Telephone Line Impedance: 600Ω, 900Ω plus 14 other complex impedance circuits *	Yes	No	No
Rejection Ratio: 80-88dB on complex waveforms, reference peak level of 0dBFS	Yes	Yes	Yes
Ring Detector Sensitivity: Off, 1, 2, 3, or 4 rings	Yes	Yes	Yes
<b>GSM Connection</b>			
Module Type: Quad-Band EGSM 850 / 900 / 1800 / 1900MHz	No	Yes	Yes
5-band UMTS/HSPA+ 850 / 900 / 1800 / 1900 / 2100MHz	No	No	Yes
	No	No	Yes
Output Power: Class 4 (2W) @ 850 / 900MHz,	No	Yes	Yes
Class 1 (1W) @ 1800 / 1900MHz	No	Yes	Yes
Class 3 (0.25W 24dBm) @ UMTS	No	No	Yes
Class E2 (0.5W 27dBm) @ EDGE 850/900	No	No	Yes
Class E2 (0.4W 26dBm) @ EDGE 1800/1900	No	No	Yes
Sensitivity: -107 dBm (typ.) @ 850 / 900MHz,	No	Yes	No
-106 dBm (typ.) @ 1800 / 1900MHz	No	Yes	No
-109 dBm (typ.) @ GSM 850 / 900MHz	No	No	Yes
-110 dBm (typ.) @ DCS1800 / PCS1900MHz	No	No	Yes
-111 dBm (typ.) @ UMTS	No	No	Yes
Approvals: Fully Type approved conforming with R&TTE, European - CE, GCF, North America - FCC, PTCRB, IC, Brazil - ANATEL	No	Yes	Yes
<b>Power Supply</b>			
Power to DHY-04, S & T	Universal 12W power supply: 90 to 250V AC; 47-63Hz; fused 1A	Yes	Yes

\* These values are dependent on the actual country setting selected on the DHY-04

Connections		DHY-04	DHY-04G	DHY-04HD		
Mic/Line/AES-EBU Input:	XLR 3 pin female, with push-button mic/line selection	Yes	Yes	Yes		
Line/AES-EBU Output:	XLR 3 pin male	Yes	Yes	Yes		
Telephone Line:	RJ11 6/4 socket	Yes	No	No		
Telephone Handset/Instrument:	RJ11 6/4 socket	Yes	No	No		
GSM Antenna:	SMA socket	No	Yes	Yes		
Conferencing or Record Audio:	RJ45 socket	Yes	Yes	Yes		
Remotes:	9-way D-type socket	Yes	Yes	Yes		
Ethernet:	RJ45 socket	Yes	Yes	Yes		
RS232 Serial:	9-way D-type socket	Yes	Yes	Yes		
Power:	IEC mains (CEE22)	Yes	Yes	Yes		
<b>Accessories Order Code</b>		<b>Description</b>				
DHY-04CON	Front Panel Conversion Kit, DHY-04S to DHY-04					
DHY-04SCON	Front panel conversion kit, DHY-04 free standing to DHY-04S 19" (48cm) rack-mount front					
DHY-04TCON	Front panel conversion kit, DHY-04 or DHY-04S, to DHY-04T 19" (48cm) rack-mount front					
DHY-04GCON	Front Panel Conversion Kit, DHY-04GS to DHY-04G					
DHY-04GSCON	Front panel conversion kit, DHY-04G free standing to DHY-04GS 19" (48cm) rack-mount front					
DHY-04GTCON	Front panel conversion kit, DHY-04G or DHY-04GS, to DHY-04GT 19" (48cm) rack-mount front					
DHY-04HDCON	Front Panel Conversion Kit, DHY-04HDS to DHY-04HD					
DHY-04HDSCON	Front panel conversion kit, DHY-04HD free standing to DHY-04HDS 19" (48cm) rack-mount front					
DHY-04HDTCON	Front panel conversion kit, DHY-04HD or DHY-04HDS, to DHY-04HDT 19" (48cm) rack-mount front					
DHY-04CONF	Conference Cable to Connect 2 x DHY-04(G or HD) Units					
<b>Physical Specification</b>		<b>Height</b>	<b>Width</b>	<b>Depth*</b>	<b>Total Nett Weight</b>	<b>Total Gross Weight</b>
DHY-04 (Raw):	Automatic digital telephone hybrid, free standing					
DHY-04G (Raw):	Automatic digital GSM hybrid TBU, free standing	4.5cm 1.8"	21.8cm 8.6"	17.5cm 6.9"	1.4kg 3lbs	2.2kg 4.8lbs
DHY-04HD (Raw):	Automatic digital HD hybrid TBU, free standing					
DHY-04, DHY-04G & DHY-04HD (Boxed):		6cm 2.4"	34cm 13.4"	27cm 10.6"		
DHY-04S (Raw):	Automatic digital telephone hybrid, rack mounted					
DHY-04GS (Raw):	Automatic digital GSM hybrid TBU, rack mounted	4.5cm (1U) 1.8" (1U)	48.3cm (19" rack width)	17.5cm 6.9"	1.45kg 3.2lbs	2.3kg 5lbs
DHY-04HDS (Raw):	Automatic digital HD hybrid TBU, rack mounted					
DHY-04S, DHY-04GS & DHY-04HDS (Boxed):		6.8cm 2.7"	58.8cm 23"	27cm 10.6"		
DHY-04T (Raw):	Twin automatic digital telephone hybrid, rack mounted					
DHY-04GT (Raw):	Twin automatic digital GSM hybrid TBU, rack mounted	4.5cm (1U) 1.8" (1U)	48.3cm (19" rack width)	17.5cm 6.9"	2.80kg 6.2lbs	4.4kg 9.7lbs
DHY-04HDT (Raw):	Twin automatic digital HD hybrid TBU, rack mounted					
DHY-04T, DHY-04GT & DHY-04HDT (Boxed)		6.8cm 2.7"	58.8cm 23"	27cm 10.6"		

\*Depth is measured from the front to the end of the connectors fitted to the back of the unit.

## Free Sonifex Switchboard Software - Remote Control of DHY-04/G/HD Hybrids

Software for remote control of the DHY-04 range of digital telephone hybrids is available for download free of charge. The software runs on Windows 7/8/10 and allows the control of up to 24 digital hybrids, including the GSM (DHY-04G) and HD Voice (DHY-04HD) versions of the products, all from one screen.

The software includes a Phone Book, a Chat Screen, Speed Dials, a Dial Pad and a Broadcast Clock.

It uses a local or networked SQL database for shared access to the hybrids and the interface is designed for use with a Full HD resolution touchscreen, although it can be used with traditional mouse and keyboard inputs.

To download, please go to the Software Downloads section of the Sonifex website.

The screenshot displays the Sonifex Software Switchboard interface. At the top, the 'LINES' section shows a status bar with signal strength and battery indicators, and a table with columns for LINE, NAME, LOCATION, NUMBER, and STATUS. Line 1 is highlighted with 'DHY-04HD' and 'AVAILABLE'. Below this is a 'DIAL PAD' with buttons for DIAL, DROP, BACK, CLR, and speed dials (SD1-SD7). A 'CLOCK' widget shows the time 15:59 and the date Tuesday, 12 May 2015. The 'PHONE BOOK' section contains a table of callers and locations. At the bottom, there is a navigation bar with buttons for PHONE BOOK, DIAL PAD, SPEED DIALS, LINES, and CLOCK. A secondary dial pad is visible at the bottom right, and the system time is 11:32:41 on Friday, 26 February 2016.

LINE	NAME	LOCATION	NUMBER	STATUS
1	DHY-04HD			AVAILABLE

NAME	LOCATION	NUMBER	NOTE
1 Caller 1	Location 1	11 111 1111	Called 1st
2 Caller 2	Location 2	22 222 2222	Called 2nd
3 Caller 3	Location 3	33 333 3333	Called 3rd
4 Caller 4	Location 4	44 444 4444	Called 4th
5 Caller 5	Location 5	55 555 5555	Called 5th
6 Caller 6	Location 6	66 666 6666	Called 6th
7 Caller 7	Location 7	77 777 7777	Called 7th
8 Caller 8	Location 8	88 888 8888	Called 8th

# **SONIFEX**

[www.sonifex.co.uk](http://www.sonifex.co.uk)

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