

# TELEPHONE HYBRID-2

## USER MANUAL

Version 1.05 (smd)

Dear Customer,

Thank you for choosing the Telephone Hybrid-2.

This time you are not faced with a huge manual because it is simply not necessary because of the natural recognition of all functions on the user interface. All functions are self-explanatory and you will certainly appreciate the ergonomics of this design.

We are confident that you will be using the Telephone Hybrid for many years to come, and wish you a lot of success with your operation.

With kind regards,

Duco de Rijk  
md

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# INTRODUCTION

D&R's newest Telephone Hybrid-2 is the active version of the well known passive one, successfully sold over the last 5 years.

Its concept originates from many demands for a more sophisticated hybrid with more features.

The Telephone Hybrid-2 is an analogue unit with digital control and features like ducking making intelligibility a lot better in broadcast.



## What is a telephone hybrid?

Telephone hybrids 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 canceling out the unwanted signal they also facilitate two-way communication down a single telephone line. Each hybrid has a telephone line connection, a handset connection and separate connectors for audio input and output from a broadcast mixer, or other professional audio source.

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

CONNECT BUTTON: (RING)	Line connect switch to connect and disconnect calls from the telephone line. It can be remotely driven by connecting a switch to the GPIO sub D connector.
LC:	Variable Low Cut filter to filter out unwanted low frequency noise.
HC:	Variable High Cut filter to filter out unwanted high frequency noise.
Ducking	Indicates when caller's signal is reduced.
RECEIVE:	Level control for incoming signal from caller.
SEND:	Level control for outgoing signal to caller.



## Back panel lay-out

Power	mains power switch.
Power Cord	The unit is powered by a removable IEC type power cord. An internal switched power supply is built in to accept voltages between 90V - 245V
LINE:	RJ-12 connector to connect with the public telephone network.
PHONE:	RJ-12 connector to connect with a handset.
C-BALANCE:	8 pole mini-dip switch to select the optimum side tone attenuation
R-BALANCE	Internal potentiometer to adjust for optimum side tone attenuation.
GPI	Jack connector for remote control.
AUDIO + GPIO	A combination of audio in/outputs and logic for D&R and other broadcast mixers.
RECEIVE	Male XLR to be connected to input of the mixer.
SEND	Female XLR input to be connected to Mix Minus/Clean feed (N-1) output of the mixer.

## SYSTEM DESCRIPTION.

A large ring button enables you to pick up the line from the unit itself or from your mixer when connected via its GPIO to the telephone Hybrid. When a call comes in it lights up green in the rhythm of the ring. When the line is picked up by pushing the button it turns into red. When it starts blinking red the line connection is lost.

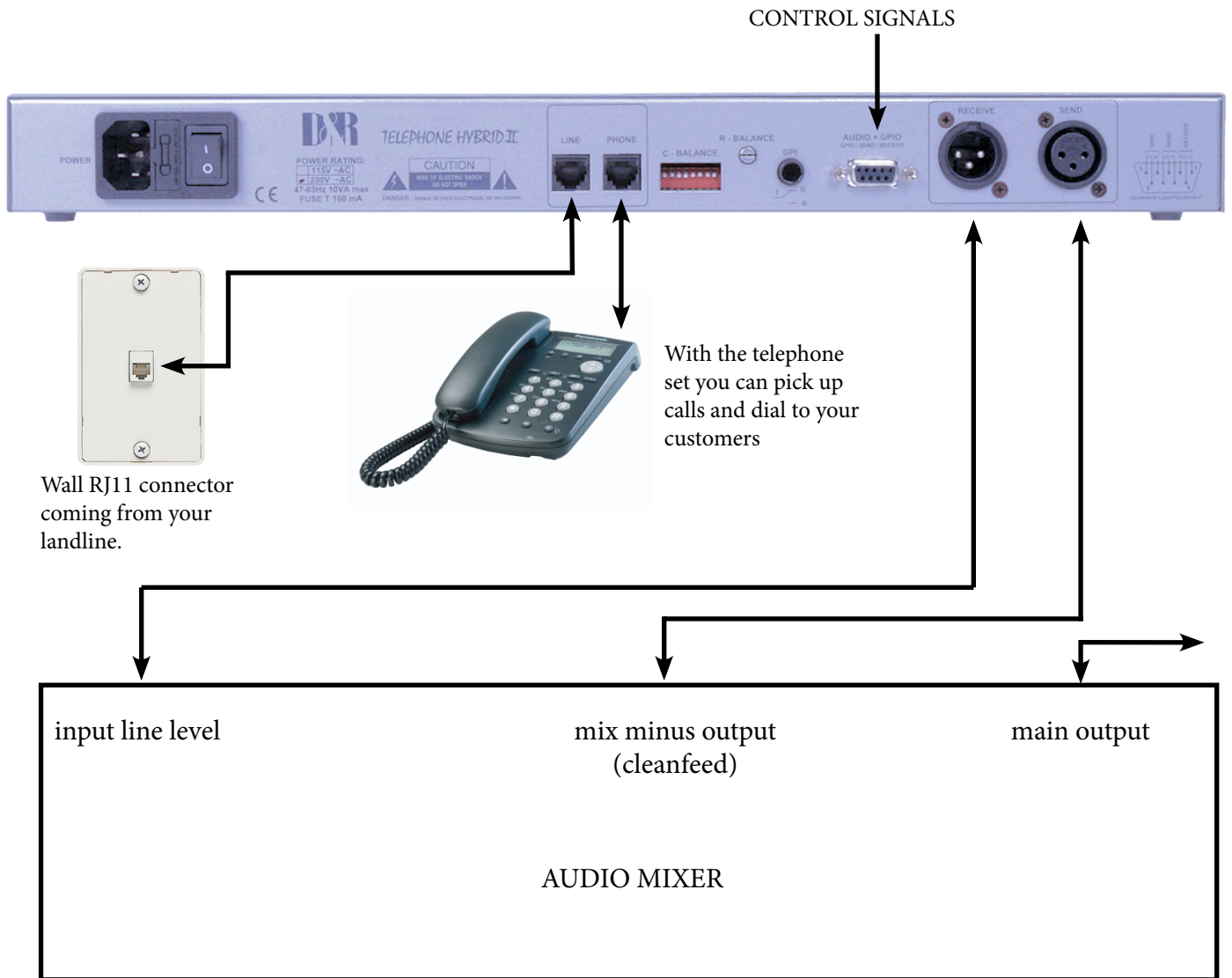
Both levels of receive and send can be adjusted to suit your requirements. Incoming signals can be tailored by the variable high and low cut signal while talking to people calling the station.

A ducking system reduces the incoming signal while talking to people calling the station to provide for an improved intelligibility.

## HIGH LIGHTS

- Active balanced interfacing.
- Variable high and low cut filters.
- Industry standard connectors
- Superb audio separation.
- Externally adjustable R and C balance.
- Remotely controllable.
- GPIO interfacing with mixing consoles.
- Auto Ducking.

# WIRING OF THE TELEPHONE HYBRID-2



# SETTING UP PROCEDURE

Connect the two wires of the telephone line's wall unit to the RJ-11 connector labeled LINE and connect the telephone appliance itself to the Hybrid's RJ-11 connector labeled PHONE. Note that to originate calls, a local phone must be connected to the system.

Now the hybrid is interfaced (fully balanced) between your telephone appliance and its connection to the outside world. The hybrid can now split the send and return signals.

Now connect the hybrid's balanced audio input (SEND on XLR male) to a (preferable) balanced mixer output of around +4dBu. This output has to be the mix of all signals except the signal coming from the hybrid itself to avoid feedback. An Aux. output will do or in broadcast mixers a clean-feed is the best.

The balanced RECEIVE output of the Hybrid has to be connected to a line input of the mixing console.

Note that this signal is NOT to be send to the output where the Hybrid's input is connected to. So in case of use of an Aux send this local channel Aux send needs to be turned off. In case of use of a clean-feed buss, this input channel needs to be disconnected from the clean-feed buss.

Turn the LC control fully counter clockwise and the HC control fully clockwise.

Position RECEIVE and SEND controls in their mid position.

If a local phone is connected, originate a call to a remote side. If no local phone is present, someone at a remote site must call you. When a call comes in the large ring BUTTON on the left side of the unit lights up green in the rhythm of the ring. When the line is picked up by pushing the button it turns into red. When it starts blinking red the line connection is lost.

If you are at the originating side pres the CONNECT button to connect the Telephone Hybrid-2 to the phone line after the call has been established. The phone will be disconnected now. The caller will now hear the signal send to the Hybrid and the output of the Hybrid will present the callers signal only with the send signal heavily attenuated.

To achieve the optimum attenuation you need to adjust the C and R balance first.

This is how it is performed:

1. Check if the telephone connection is established and all connections to the mixing console are correctly wired.
2. Now activate a CUE/PFL/SOLO button of the mixing console channel where the return signal of the Hybrid is connected to. You will faintly hear the send signal coming out of the mixing console.
3. Adjust the R-Balance for minimum feed through of the mixers send signal.
4. Listen now which mini-dip switch gives a further reduction of the return signal.
5. Maybe it is good to re-adjust the R-balance after having selected another dip-switch.
6. Repeat steps 3 and 4 until no further improvement are achieved.

## DUCKING

The Hybrid has an automatic gain adjustment of the incoming signal from the caller when the presenter speaks. This feature both improves the side tone reduction and gives the presenter a level advantage over the caller when he interrupts the caller. When both parties are speaking the caller's signal is reduced then.

# INPUTS / OUTPUTS

## SEND (to caller)

XLR FEMALE	TYPE	CONNECTION
Pin 1	Screen	Audio ground
Pin 2	In Phase	Audio + (input)
Pin 3	Out of Phase	Audio – (input)

## RECEIVE (from caller)

XLR MALE	TYPE	CONNECTION
Pin 1	Screen	Audio ground
Pin 2	In Phase	Audio + (input)
Pin 3	Out of Phase	Audio – (input)

## SUB D-9 AUDIO + GPIO

GPIO / SEND / RECEIVE	FUNCTION	CONNECTION
Pin 1	Receive (from caller)	Audio + (output)
Pin 6	Receive (from caller)	Audio - (output)
Pin 2	Receive (from caller)	Audio ground
Pin 7	Send (to caller)	Audio + (output)
Pin 3	Send (to caller)	Audio - (output)
Pin 8	Send (to caller)	Audio ground
Pin 4	Logic ground	47 Ohm to ground
Pin 9	GPI	+ 5volt TTL input
Pin 5	GPO	Open collector to ground

## GPI

GPI	FUNCTION	CONNECTION
Tip	Pull down	47 ohm to ground
Ring	Pull up	+5 volt via 10kohm
Sleeve	No	Not connected

## PHONE

PHONE RJ12	FUNCTION	CONNECTION
Pin 1	n.c.	
Pin 2	A (telephone line)	In/out
Pin 3	B (telephone line)	In/out
Pin 4	n.c.	

## LINE

PHONE RJ12	FUNCTION	CONNECTION
Pin 1	n.c.	
Pin 2	A (telephone line)	In/out
Pin 3	B (telephone line)	In/out
Pin 4	n.c.	

*In case you want an external light to clearly see incoming calls use GPO pin 4 and 5 that makes a short by a FET optocoupler*

# SPECIFICATIONS

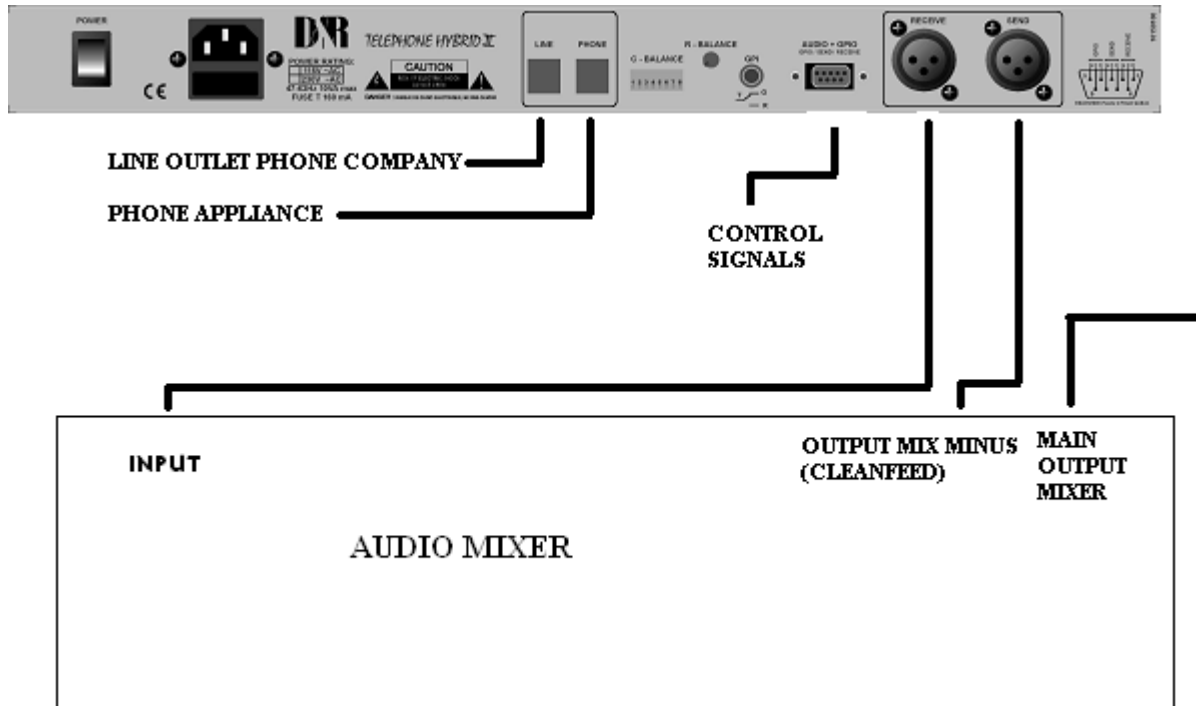
## Audio Inputs

SEND	
Impedance	10k Ohm, electronically balanced
Common mode rejection	>40dB
Maximum input level	+26dBu
Nominal input level	+4 dBu
Frequency response	20Hz – 15kHz (-3dB variable via HC and LC filters)
Connectors	XLR type 3 pin female
Gain range receive control	40dB

RECEIVE	
Impedance	< 50 Ohm, electronically balanced
Common mode rejection	>40dB
Maximum output level	+26dBu
Nominal output level	+4 dBu
Bandwidth to telephone line	250Hz – 4kHz, -3dB ref 1 kHz
Telephone line impedance	Nominally 600 ohm
Telephone line impedance range	300 ohm to 1500 ohm
Connectors	XLR type 3 pin male
Gain range send control	+6dB to -20dB
GENERAL	
Distortion	Less than 0.1% (0dBu out)
Power supply	115v / 230 v AC / 50/60Hz (factory set, NOT do this yourself)
Power consumption	10VA Maximum
Dimensions	1 HE front panel: 482x44mm
	Frame: 430x41x175mm (width x height x depth)
Weight	2.2 kg net excl packing



# WIRING



## DECLARATION OF CONFORMITY

Manufacturers Name: D&R Electronica b.v.

Manufacturers Address: Rijkade 15  
1382 GS Weesp,  
Netherlands

declares that the product

TELEPHONE HYBRID-2

Which refers to this declaration, is in accordance with the following standards or standardized documents:

EN 50081-1	EN 55013 A 12
EN 50082-1	EN 55022
EN 60065	EN 61000-3-2
EN 55020	EN 61000-3-3

Supplementary Information:

The products herewith complies with the requirements of the EMC Directive 89/336/EWG and 73/23/EWG as amended by the CE Marking Directive 93/68/EEC (1993).

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May 2021

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