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Product Name	CPIM0001	RoHS Product
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Revision History

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1. Introduction:

The CPIM0001 is a splitter module that has been specifically designed to implement the functionality of low pass filter in ISDN with 2B1Q/4B3T over ADSL application. The CPIM0001 integrate low pass filter that block the high frequency energy from reaching the ISDN device and provide isolation from impedance effects of the ISDN device on ADSL. Because the ISDN splitter connects directly to the subscriber loop media, it must also provide some protection for externally induced line hits or faults which could damage any attached equipment or endanger humans interacting with the installed equipment. The circuit protection will be provided mostly by standard central office line protection means and additional protection measures built into splitter to protect against line overstress which could damage the splitter itself.

2. References:

Ref. 1 : [ETSI TS 101 388 V1.2.1](#)

Transmission and Multiplexing (TM); Access transmission systems on metallic access cables; Asymmetric Digital Subscriber Line (ADSL)–European specific requirements [ITU-T G.992.1 modified]

Ref. 2 : [ETSI TS 101 952-1-3 V1.1.1 \(2002-05\)](#)

Specification of ADSL / ISDN splitters

Ref. 3 : [ETSI TS 102 080 V1.3.2](#)

Transmission and Multiplexing (TM); Integrated Services Digital Network (ISDN) basic rate access; Digital transmission system on metallic local lines

Ref. 4 : [ITU-T Recommendation K.21](#)

Resistibility of telecommunication switching equipment to overvoltages and overcurrents.

3. Abbreviations:

ADSL	Asymmetric Digital Subscriber Line
ISDN-BA	Integrated Services Digital Network–Basic Access
2B1Q	Baseband linecode for ISDN-BA (4-PAM)
4B3T	(or MMS43) Alternative ISDN-BA baseband linecode with higher frequency spectrum than 2B1Q
CO	Central Office
CPE	Customer Premise Equipment

4. Technical requirements:

4.1. Schematic:

The following drawing illustrates the schematic of this product.

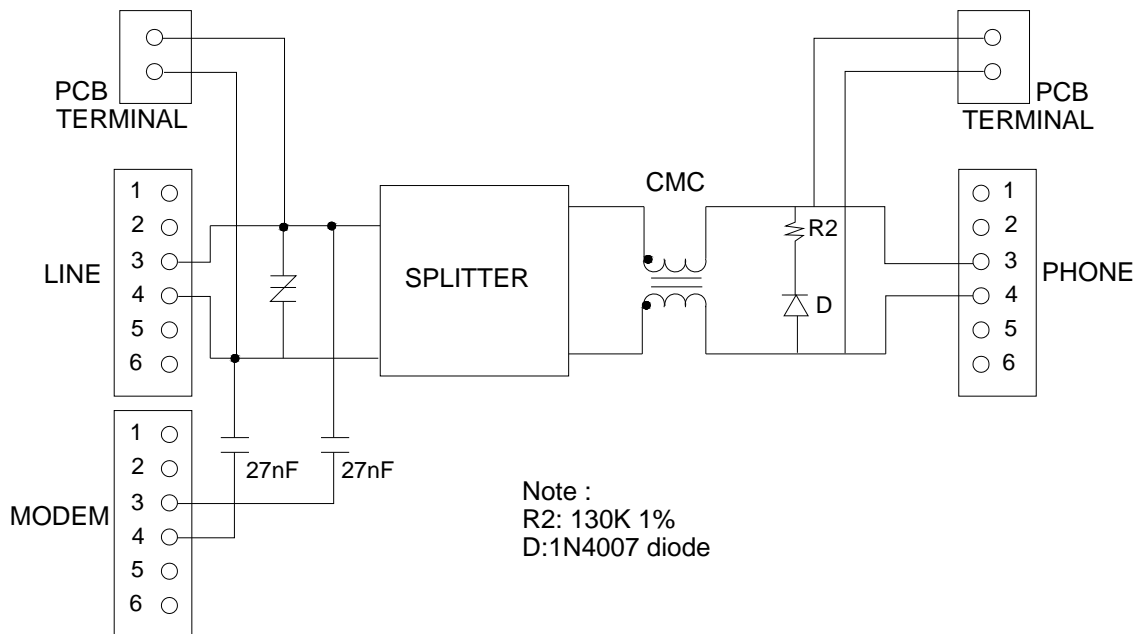
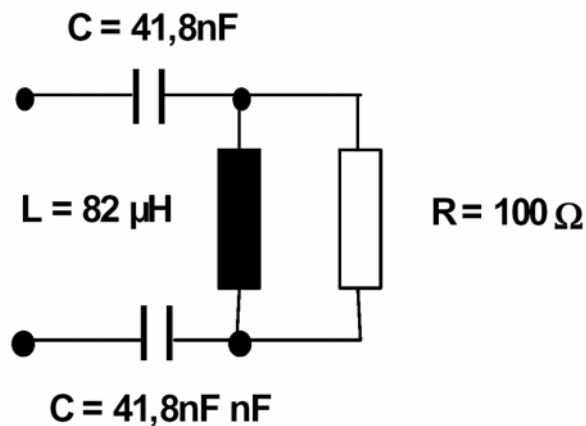


Figure 1. CPIM0001 subscriber ISDN splitter integrates a single low pass filter with DC blocking capacitors at ADSL port.

4.2. Z_{ADSL-I} definition:

In many of the tests with ISDN-BA frequencies, the ADSL port of the splitter is terminated with an impedance called Z_{ADSL-I} . This impedance model as shown in figure 2, represents the input impedance of the ADSL transceiver as seen from the ADSL port of the splitter, and does not include the blocking capacitors. The model is intended for splitter specification in the context of the present document. The purpose of this model impedance is for splitter specification, it is not a requirement on the input impedance of the ADSL transceiver.



NOTE: Z_{ADSL-I} does not include the blocking capacitors CB.

Figure 2: Schematic diagram of the impedance Z_{ADSL-I} for verifying requirements of the low pass filter

4.3. Electrical Specification:**4.3.1. General requirement:**

All of electrical specifications for ISDN path stated herein must be met and satisfied separately for single individual splitter and also for the complete splitter combination.

Splitter parameter	Electrical requirements	
	Range	Values
ISDN band (3 dB bandwidth)		DC to 94 kHz
Nominal impedance		
CO impedance Z _{Tc}		135/150 ohm
RT impedance Z _{Tr}		135/150 ohm
Modem impedance		100 ohm
Operation voltage ISDN	For 2B1Q/ 4B3T Band	
Current voice band		
Loop current		0-60 mA
DC resistance		
DC resistance (single splitter)		<=12.5 ohm
Isolation resistance tip/ring		>5 M ohm
resistance to earth		>20 M ohm
ISDN band characteristic		
Insertion loss (for 2B1Q)	1 kHz to 40 kHz	<0.8 dB
	40 kHz to 80 kHz	<2 dB
Insertion loss (for 4B3T)	1 kHz to 60 kHz	<1.2 dB
	60 kHz to 80 kHz	<2 dB
Delay distortion	0.1 kHz <f<80 kHz	<20 usec
Return loss (for 2B1Q)	1 kHz to 40 kHz	>16 dB
	40 kHz to 80 kHz	>14 dB
Return loss (for 4B3T)	1 kHz to 60 kHz	>16 dB
	60 kHz to 80 kHz	>14 dB
Unbalance about earth	300 Hz to 30 kHz	>40 dB
	30 kHz to 2208 kHz	>46 dB
	2208 kHz to 5 MHz	>30 dB
Line interface		
Attenuation	150 kHz to 2208 kHz	>65 dB

5. Environmental conditions:

5.1. Resistibility to overvoltages and overcurrents:

The splitter has to comply with requirements as per ITU-T K.21.

5.2. Climatic conditions:

5.2.1. Operating temperature:

Application: Indoor

Operation guarantee temperature -20 °C to +65 °C

5.2.2. Storage and transportation:

Low ambient temperature - 40 °C

High ambient temperature +85 °C

(According to MIL-STD-202 method 107)

5.2.3. Operation humidity:

Operation guarantee relative humidity 0 to 95% (non-condensing)

6. Reliability conditions:

6.1. Thermal shock:

Temperature from -20 °C to +85 °C for 5 cycles

(According to MIL-STD-202, method 107)

6.2. Temperature humidity exposure:

+50 °C /95RH, 96hrs

(According to MIL-STD-202, method 103)

6.3. Vibration test:

Random vibration / Overall: 1.15 g rms

Freq. (Hz): 1 → 4 → 100 → 200

PSD (g² / Hz): 0.0001 → 0.01 → 0.01 → 0.001

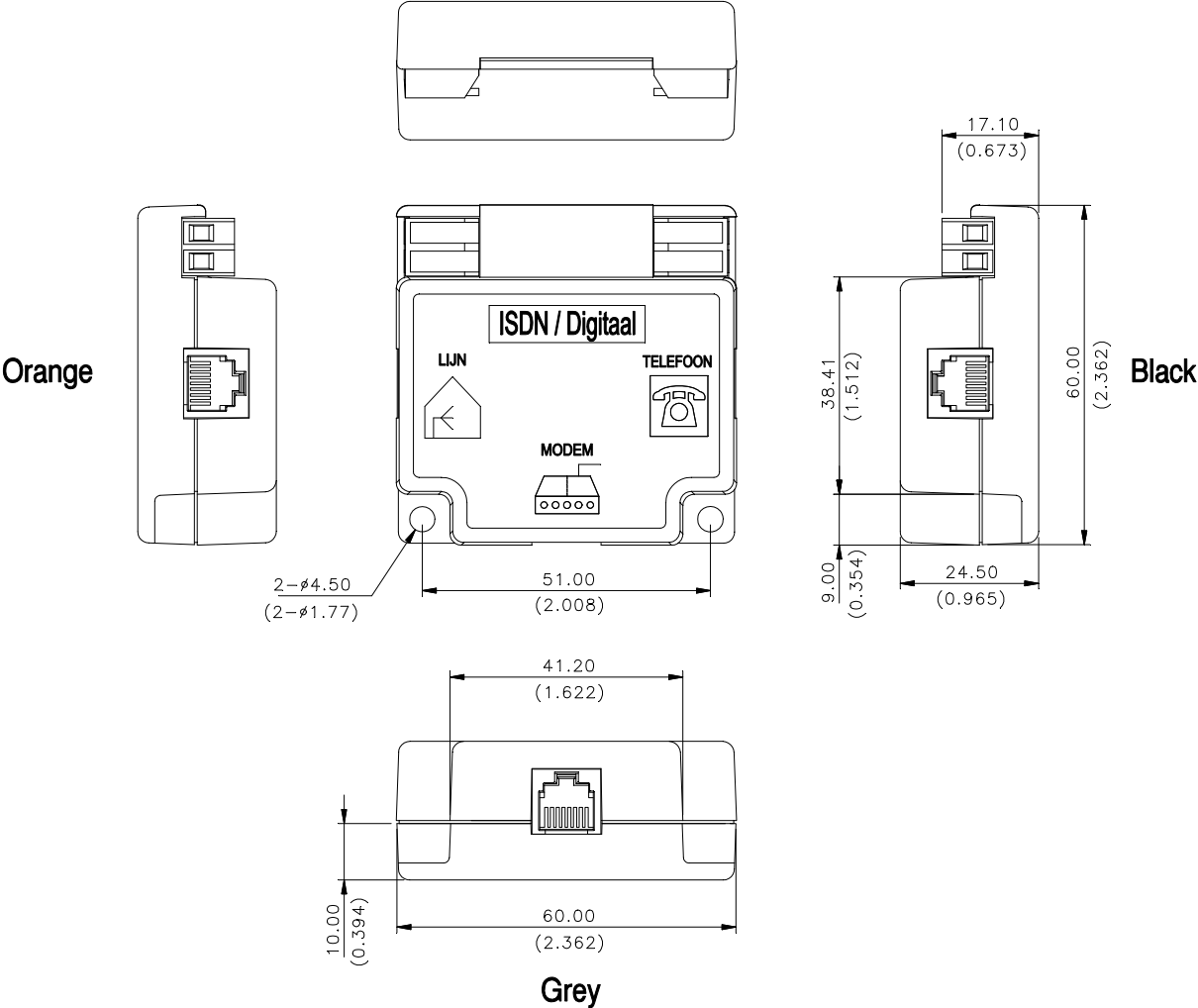
Test Axis / Time: Top / 30 mins Bottom / 10 mins

X axis / 10 mins Y axis / 10 mins

(According to ISTA PROJECT 2A)

7. Mechanical conditions:

7.1. Dimensions:



Notes:

- 1. Unit: mm (inch)
- 2. Tolerances: $\frac{\pm 0.25\text{mm}}{(\pm 0.010\text{inch})}$