10 Base-T Interface Module for Multiport Repeater Applications

EPA2162

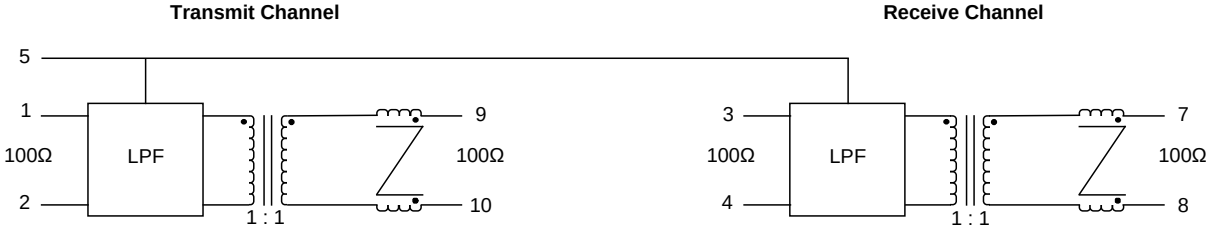
- General Purpose 10 Base-T Filter Module • Recommended for AMD MACE chip 79C940
- Robust construction allows toughest reflow processing •
- Available in SMD, DIP, DIL, and SIP packages •
- Complies with or exceeds IEEE 802.3, 10 Base-T Requirements •

Electrical Parameters @ 25° C

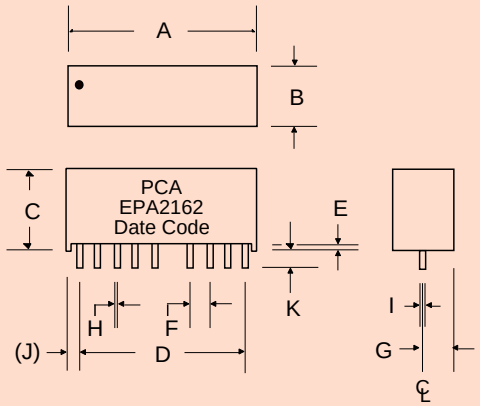
Insertion Loss (dB Max.)		**Return Loss** (dB Min., 100Ω)		**Attenuation** (dB Min.)				**Common Mode Rejection** (dB Min.)						**Crosstalk** (dB Min.)
1-10 MHz		5-10 MHz		@ 30 MHz		@ 50-100 MHz		@ 30 MHz		@ 100 MHz		@ 200-300 MHz		@ 1-10 MHz
Xmit	Rcv	Xmit	Rcv	Xmit	Rcv	Xmit	Rcv	Xmit	Rcv	Xmit	Rcv	Xmit	Rcv	
-1	-1	-18	-18	-30	-15	-40	-40	-30	-30	-30	-30	-30	-30	-35

• **Isolation** : meets or exceeds 802.3 IEEE Requirements • **Characteristic Filter Impedance** : 100 Ω • **IL** : Referenced @ 5 MHz •

Schematic



Package



Dimensions

Dim.	(Inches) Min.	Max.	Nom.	(Millimeters) Min.	Max.	Nom.
A	1.030	1.05		26.16	26.67	
B	.330	.350		8.38	8.89	
C	.420	.440		10.67	11.18	
D	.900	Typ.		22.86	Typ.	
E	.020	.030		.508	.762	
F	.100	Typ.		2.54	Typ.	
G	.165	.185		4.19	4.70	
H	.016	.022		.406	.559	
I	.008	.012		.203	.305	
(J)	.070	Typ.		1.78	Typ.	
K	.110	.130		2.79	3.30	

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The circuit below is a guideline for interconnecting PCA's EPA2162 with AMD 79C940 MACE 10 Base-T PHY chip over UTP cable. Further details of system design, such as chip pin-out, etc. can be obtained from the specific chip manufacturer. This part is designed to show excellent in band charactoristics such as insertion loss, return loss. Additional care has been given in the design to provide the maximum common mode attenuation possible in the structure.

Typical insertion loss of the isolation transformer/filter is 0.7dB. This parameter covers the entire spectrum of the encoded signals in 10 Base-T protocols. However, the predistortion resistor network introduces some loss which has to be taken into account in determining how well your design meets the Standard Template requirements. Additionally, the following need to be considered while selecting resistor values :

a. The filter needs 100 ohms termination, thus the Thevenin's equivalent resistance seen by the filter looking into the transmit outputs from the chip must be equal to a value close to 100 ohms. The typical driver output impedance is 5 ohms. Thus choose R1 and R2 values that are lowered by 5 ohms on each leg. Following these guidelines will guarantee that the return loss specifications are satisfied at all extremes of cable impedance (i.e. 85 ohms to 115 ohms) while the module is installed in your system.
b. That the template requirements are satisfied under the worst case Vcc (i.e. 4.5V), will impose a further constraint on resistor selection, in that they ought to be the minimum derived from the calculations. Add R3 for more flexibility in setting voltage levels at the outputs.
c. Consider the effect of cable length to be expected in the given applicationfor which the design is being targeted.

Values given here provide an effective termination of 2(61.9//422)//1200 or approx. 100 ohms. Thus, bench measurement of return loss is done by shorting all input pins of the transmit channel. This assumes, as is evident from above, that the MACE ouput driver impendance is less than 1 or 2 ohms at most.

Note that some systems have auto polarity detection and some do not. If not, be certain to follow the proper polarity.

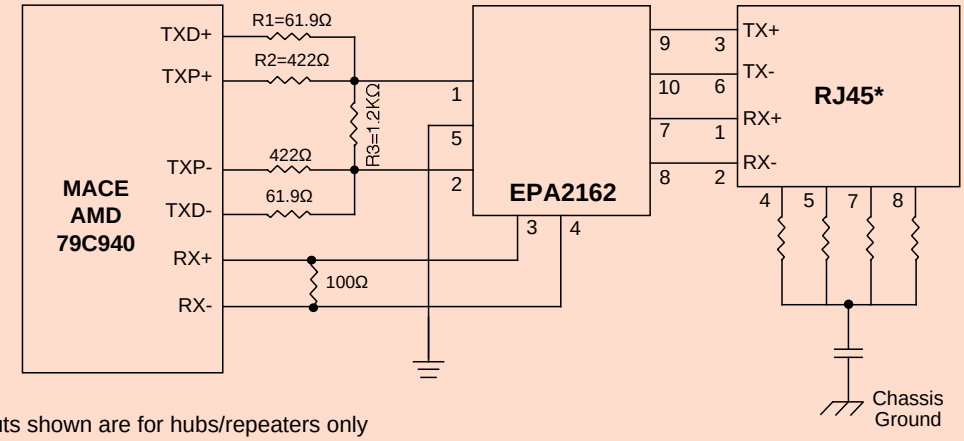
It is recommended that system designers ground the chip side center taps via a low voltage capacitor. It is not neccessary to add another capacitor between this and the ground.

The pulldown resistors used around the RJ45 connector have been known to suppress unwanted radiation that unused wires pick up from the immediate environment. Their placement and use are to be considered carefully before a design is finalized.

It is recommended that there be a neat separation of ground planes in the layout. It is generally accepted practice to limit the plane off at least 0.08 inches away from the chip side pins of EPA2162. There need not be any ground plane beyond this point.

For best results, PCB designer should design the outgoing traces preferably to be 50 ohms, balanced and well coupled to achieve minimum radiation from these traces.

Typical Application Circuit for UTP with external Resistor Network



Notes : Pin outs shown are for hubs/repeaters only
for NIC swap pins 1-2 with 3-6.

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