

FDMX

De-Multiplexer for Broadcast and Navigation Signals with Resistive DC Loads Dual (AM/FM), DAB3/DAB-L, DVB-T, GNSS, SAT (SDARS)

Features

- de-multiplexer for broadcast bands
- DC loads in each channel
- optical indication of phantom voltage
- direct fakra connection to (DUT)

Applications

- AM, FM, DAB, DVB-T, SDARS
- GNSS: GPS, GLONASS, GALILEO
- automotive infotainment test
- R&D
- production



At a Glance

FDMX from Becker Nachrichtentechnik is a compact de-multiplexer unit as table top unit in 50 Ohm technology. The FDMX splits the broadcast bands into the individual sections and makes them available at 6 RF ports. The ports have coded Fakra connectors, that have become standard in automobile infotainment, for the direct connection to the device under test (DUT). All outputs have integrated DC loads for the emulation of active antennas. Thus the DUT has the full RF and DC environment for ready to use operation in laboratories.

The presences of phantom voltages coming from the DUT are indicated by LEDs on the front side of the FDMX.

With help of the FDMX cost efficient solutions for multi signal distribution in R&D and factory buildings can be realized using only one common coaxial cable for transmission of all broadcast and GNSS signals to the test setups.

Special Features

The FDMX unit enables plug and play solution for the RF connection of car infotainment components. FDMX has dual ports for "analogue" AM/FM radio signals, one port for digital radio DAB3/DAB-L signals, one port for digital television DVB-T signals, one port for satellite navigation signals GNSS (GPS, GALILEO, GLONASS) and one port for satellite radio signals SAT (SDARS, XM radio). All RF ports features resistive DC loads for the phantom supplies in the DUTs. A Fakra cable set with cable length 1 m for all RF

connectors are part of the product package.

Rugged Design

The FDMX unit is built in a milled aluminum case to give best shielding for avoiding EMI influences caused by radio signals coming from the environment. The RF connector for the multi signal input is N female.

Becker Nachrichtentechnik GmbH ■ Kapellenweg 3 ■ 53567 Asbach - Germany ■ www.becker-rf.com

Quality Made in Germany

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RF Specification

RF Specification						
Parameter	Symbol	Min.	Тур.	Max.	Unit	Condition
impedance	Z		50		Ohm	
RF COM port						
low frequency	f _{min}		50	150	kHz	
high frequency	f _{max}	2345	2700		MHz	
return loss	S ₁₁		-12	-7	dB	
RF input power	P _{in}			+10	dBm	
maximum DC Voltage	U _{DC}			20	V	
ESD discharge resistor	R _{ESD}		4.7		kΩ	
connector	X _{COM}		N fer	nale		
AM (Dual AM/FM)						
low frequency	f _{min}		50	150	kHz	
high frequency	f _{max}	30			MHz	
return loss	S ₂₂		-15	-10	dB	
insertion loss	S ₂₁	-4.5	-3.5	-3.0	dB	
FM (Dual AM/FM)						
low frequency	f _{min}			77	MHz	
high frequency	f _{max}	108			MHz	
return loss	S ₂₂		-20	-12	dB	
insertion loss	S ₂₁	-5.5	-4.0	-3.0	dB	
attenuations	a _{DAB}		-35	-25	dB	DAB3 (174 228 MHz)
	a _{DVB-T}		-75	-50	dB	DVB-T (474 786 MHz)
	aGNSS		-90	-65	dB	GNSS (1555 1625 MHz)
	a _{SAT}		-80	-55	dB	SAT (2320 2345 MHz)
RF input power	P _{RF}			+10	dBm	
DC load	I _{DC}	32	35	38	mA	U _{DC} = 8.5 V
	U _{DC}	0	8.5	10.0	V	$R_{L} = 248 \Omega$, 400 mW max.
connector	X _{AMFM}	Dual Fa		ug (white,	male)	
DAB3 / DAB-L						
low frequency	f _{min}			170	MHz	DAB3
high frequency	f _{max}	240			MHz	
return loss	S ₃₃		-15	-9	dB	
insertion loss	S ₃₁	-3.0	-2.0	-0.5	dB	
	-31	-2.5	-1.5	-0.5	dB	f ≥ 174 MHz
low frequency	f _{min}			1452	MHz	DAB-L
high frequency	f _{max}	1480			MHz	
return loss	S ₃₃		-15	-9	dB	
insertion loss	S ₃₁	-6.0	-4.0	-3.0	dB	
attenuation	a _{AMFM}	0.0	-45	-35	dB	AM/FM (0.15 108 MHz)
	a _{DVB-T}		-35	-25	40	DVB-T (474 786 MHz)
	a _{GNSS}		-40	-25		GNSS (1555 1625 MHz)
	a _{GNSS} a _{SAT}		-35	-25		SAT (2320 2345 MHz)
RF input power	P _{RF}			+10	dBm	
DC load		32	35	38	mA	U _{DC} = 8.5 V
		0	8.5	10	V	$R_{\rm L} = 248 \ \Omega, 400 \ {\rm mW} \ {\rm max}.$
connector	X _{DAB}	-		(black, ma		Λ _L - 270 32, 700 million.
	N DAB	<u> </u> 1 a Ki	a A plug			<u> </u>

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$\begin{array}{c c c c c c c c c c c c c c c c c c c $			700		470		
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	• • •		790	10	7		
attenuation a_{AMFM} -100 -60 dB AM/FM (0.15108 MHz) a_{DABA} -45 -35 dB DAB3 (174228 MHz) a_{DABL} -45 -35 dB DAB2 (14521492 MHz) a_{6NSS} -50 -40 dB GNSS (15551625 MHz) a_{6NS} -55 -40 dB SAT (23202345 MH) RF input power P_{RF} +10 dBm DC load lpc 32 35 38 mA Upc = 8.5 V Connector Xpvs-r Fakra E plug (green, male) RE return loss S55 MHz low frequency fmax 1625 MHz Mex return loss S55 -12 -7 dB Mex attenuation a_AMFM -90 -75 dB DAB3 (17428 MHz) apA83 -90 -75 dB DAB4. (14521480 MHz) apA84 -30 -55 dB DAB4. (14521480 MHz) apA84 <			2.5		1		
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RF input power P_{RF} +10 dBm U_{DC} 32 35 38 mA U_{DC} = 8.5 V DC load I_{DC} 0 8.5 10.0 V R_t = 248Ω, 400mW max. Connector X_{DVB-T} Fakra E plug (green, male) R_t = 248Ω, 400mW max. GNSS - 1555 MHz iow frequency fmin. 1555 MHz insertion loss S55 -12 -7 dB attenuation a _{AMEM} -90 -75 dB DAB-L (1452 108 MHz) a _{DAB3} -90 -75 dB DAB-L (1452 1480 MHz) aDAB-L (1452 1480 MHz) a _{DAB4} -35 -25 dB DAT (2320 2345 MH) RF input power P _{RF} +10 dBm U _{DC} = 5 V DC load I _{DC} 27 30 33 mA U _{DC} = 5 V Connector X _{GNSS} Fakra C plug (blue, male) SAT (2320 2345 MH) RL = 165 Ω, 500 mW max. <t< td=""><td></td><td>aGNSS</td><td></td><td></td><td></td><td></td><td></td></t<>		aGNSS					
DC load I _{DC} 32 35 38 mA U _{DC} = 8.5 V connector V_{DVB-T} Fakra E plug (green, male) R _L = 248Ω, 400mW max. GNSS Fakra E plug (green, male) MHz high frequency f_{min} 1555 MHz return loss S ₅₅ -12 -7 dB insertion loss S ₅₁ -7 -4 -3 dB attenuation a _{AMFM} -90 -75 dB DAB3 (174 228 MHz) a _{DABL} -35 -25 dB DAB-L (1452 1480 MHz) a _{DABL} -35 -25 dB DVB-T (474 786 MHz) a _{DABL} -35 -25 dB SAT (2320 2345 MH) RF input power P _{RF} +10 dBm DC load I _{DC} 27 30 33 mA U _{DC} = 5 V connector X _{GNSS} Fakra C plug (blue, male) SAT (2320 2345 MH) SAT (520, 500 mW max. high frequency f _{min} 2320		a _{SAT}		-55			SAT (23202345 MH)
$ \begin{array}{ c c c c c c } & 0 & 8.5 & 10.0 & V & R_L = 248\Omega, 400 mW max. \\ \hline \mbox{connector} & X_{DVB-T} & Fakra E plug (green, male) \\ \hline \mbox{GNSS} & & Fakra E plug (green, male) \\ \hline \mbox{GNSS} & & & & & & & & & & & & & & & & & & $	RF input power	P _{RF}				dBm	
Solution Fakra E plug (green, male) Test and the plug (green, male) GNSS fmin 1555 MHz independency fmin 1555 MHz independency fmax 1625 MHz insertion loss S55 -12 -7 dB insertion loss S51 -7 -4 -3 dB attenuation a _{AMFM} -90 -75 dB DAB3 (174 228 MHz) a _{DAB3} -90 -75 dB DAB4 (1452 1480 MHz) a _{DAB4} -35 -25 dB DAB-L (1452 1480 MHz) a _{DAB4} -35 -25 dB SAT (220 2345 MH) Best to plot to p	DC load		32				$U_{DC} = 8.5 V$
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GNSS Image <	connector		Fakr	a E plug	(green, m	nale)	
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UDC 0 5 9 V RL = 165 Ω, 500 mW max. Connector X _{GNSS} Fakra C plug (blue, max) - </td <td></td> <td></td> <td>07</td> <td>20</td> <td></td> <td></td> <td></td>			07	20			
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aGNSS-20-15dBGNSS (1555 1625 MHz)RF input power P_{RF} +10dBmDC load ² I_{DC} 475053mA $U_{DC} = 5 V$ U_{DC}057VRL = 100 Ω, 500mW max.	attenuation	a _{800M}					
aGNSS-20-15dBGNSS (1555 1625 MHz)RF input power P_{RF} +10dBmDC load ² I_{DC} 475053mA $U_{DC} = 5 V$ U_{DC}057VRL = 100 Ω, 500mW max.		a _{DABL}			-18		
RF input power P_{RF} +10 dBm DC load ² I_{DC} 47 50 53 mA $U_{DC} = 5 V$ U_{DC} 0 5 7 V $R_L = 100 \Omega$, 500mW max.		aGNSS		-20	-15	dB	
DC load ² I _{DC} 475053mAU _{DC} = 5 VU _{DC} 057VR _L = 100 Ω, 500mW max.	RF input power				+10	dBm	
U_{DC} 0 5 7 V R_{L} = 100 Ω, 500mW max.	DC load ²		47	50	53	mA	$U_{DC} = 5 V$
			0				
connector Fakra F plug (brown, male)	connector		Fakr	a F plug (brown, m	nale)	

Common Specification

Parameter	Symbol	Min.	Тур.	Max.	Unit	Condition
dimensions	WxHxD	approx.	154 x 37 x	x 93	mm	without connectors
weight	m		0.7		kg	
operating temp. range	To	+5		+40	°C	housing surface
storage temp. range	Ts	-40		+70	°C	
ordering information	FDMX		P/N: 1310.6003.1		03.1	Fakra cable set is part of product package

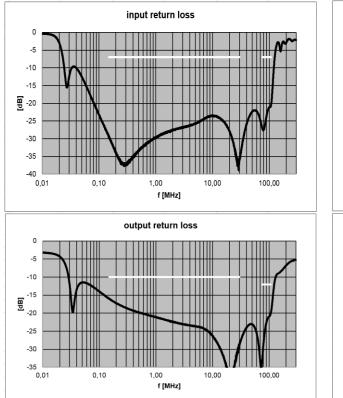
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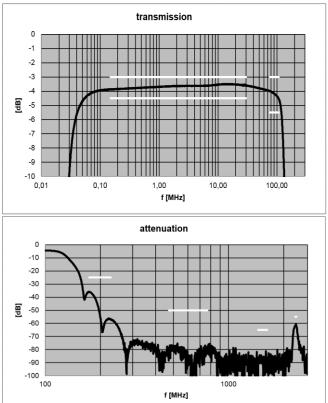
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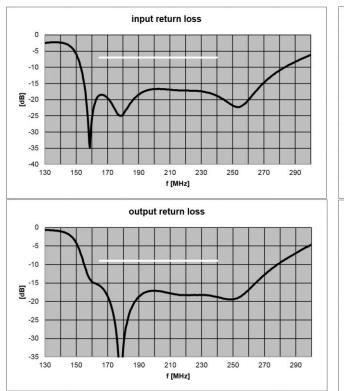
FDMX

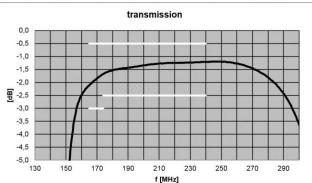
S-Parameters (typical responses) AM/FM signal path

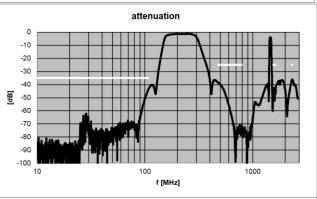




DAB3 signal path







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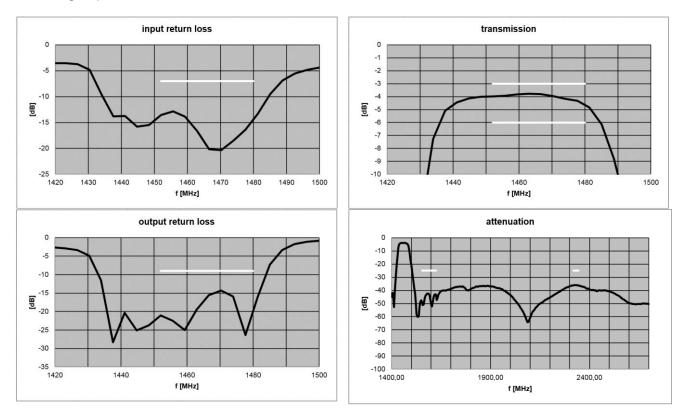
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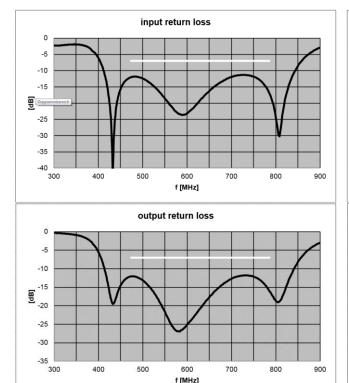


RoHS compliant in accordance with EU Directive 2015/863

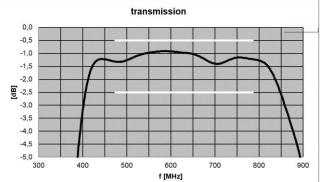
DAB-L signal path

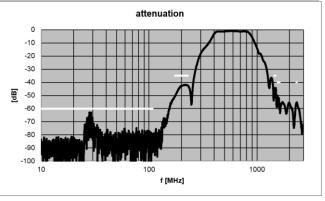


DVB-T signal path



f [MHz]



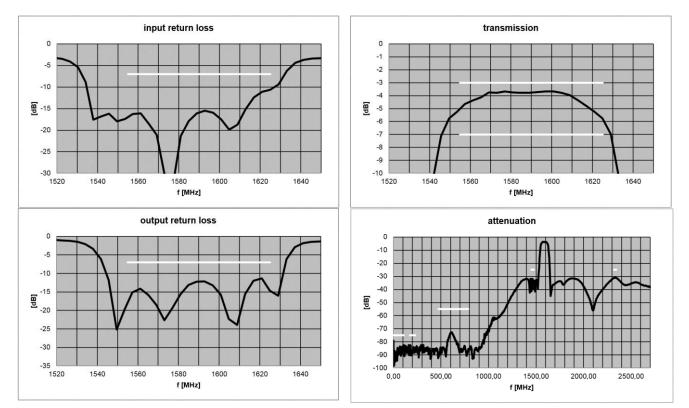


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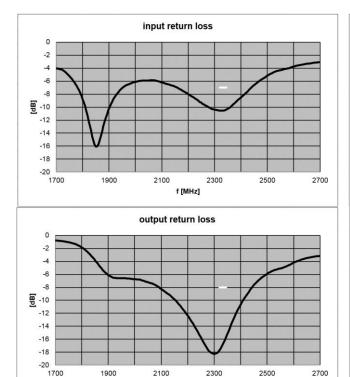
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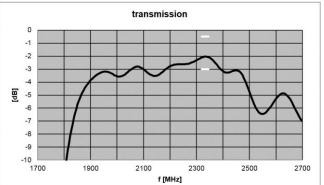


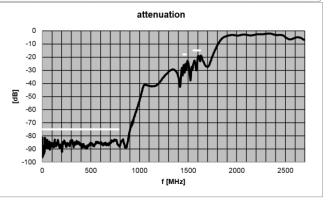
GNSS signal path



SAT (SDARS) signal path







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2300

2500

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1900

2100

f [MHz]

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2700

RoHS compliant in accordance with EU Directive 2015/863

Appearances



Front side

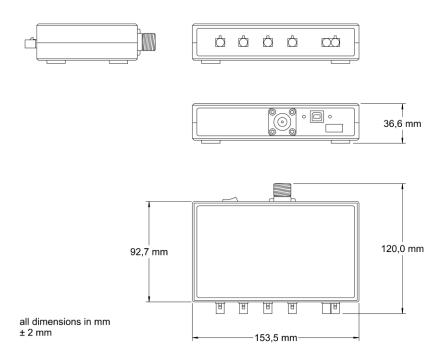


Rear Side

Becker Nachrichtentechnik GmbH
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www.becker-rf.com



Dimensions



Related Products

Product	Description	P/N
FDMX	De-Multiplexer for Broadcast and Navigation Signals with Resistive DC Loads.	1310.6003.1
	Dual (AM/FM), DAB3/DAB-L, DVB-T, GNSS, SAT (SDARS)	
FDMX-PT	De-Multiplexer for Broadcast and Navigation Signals with Programmable DC Loads 0 300 mA. Dual (AM/FM), DAB3/DAB-L, DVB-T, GNSS, SAT (SDARS)	1310.6003.2
FDMX2	De-Multiplexer for Broadcast and Navigation Signals with Resistive DC Loads. Dual (AM/FM/DAB3), DVB-T, GNSS, SAT (SDARS)	1809.6003.1
FDMX2-PT	De-Multiplexer for Broadcast and Navigation Signals with Programmable DC Loads 0 300 mA. Dual (AM/FM/DAB3), DVB-T, GNSS, SAT (SDARS)	1809.6003.2
FDML	Dual Port Adapter for AM/FM and DAB3 Broadcast Signals with Resistive DC Loads	1310.6103.2
FDMX-CS	Fakra Cable Set, length 1 m. Includes 4 RF cables with 1 dual RF cable	1310.0107.1
FDMX-AA	AC/DC Wall Wart Power Adpater for USB	1310.0108.1

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