

TSI-6X32H

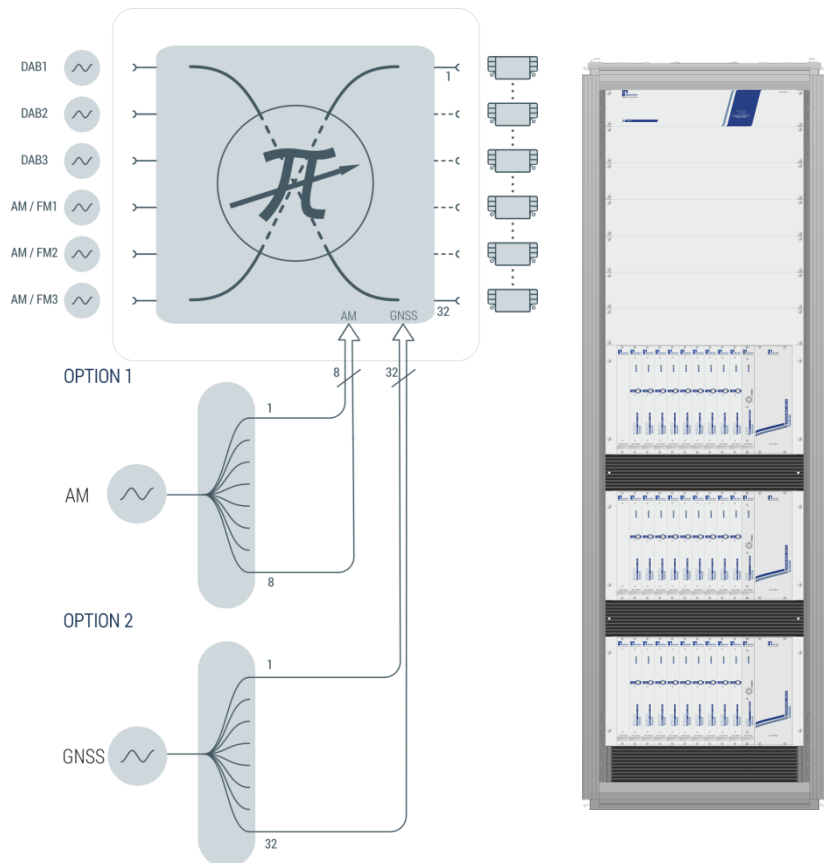
Test System for Infotainment with FM/DAB Handover Emulator

Features

- 6 FM/DAB generator inputs
- 32 outputs
- Compact design 19", 38 U
- Optional AM generator input
- Optional GNSS generator input

Applications

- car infotainment
- product integration & verification
- FM/DAB hand-over test
- AM, GNSS signal distribution



Scope

TSI-6X32H is a broadcast distribution infrastructure for large infotainment integration and verification laboratories. Connected to a set of up to 6 FM/DAB generators, every of up to 32 laboratory seats can be supplied with a composite RF signal that is individually composed of a programmable mix of the generator signals. This setup allows to recreate a realistic car radio environment, whereby the car radio receives multiple radio broadcast stations simultaneously with varying propagation loss. In particular it allows to simulate a handover between broadcast towers receiving the same radio program, while switching from FM to DAB or vice versa. Reproducing such a complex environment in the laboratory saves costs and time during product integration and verification. The laboratory installation is particularly cost-efficient, as the composite signals are made available to the laboratory seats via a single coaxial cable.

High level dynamic

The system's overall insertion loss is small. A set of 6 x 32 variable attenuators with an attenuation range of 80 dB are provided. The attenuators can be configured hundreds of times per second, so that real-time channel transition scenarios can be produced.

Versatile control

The TSI-6X32H can be controlled via LAN remote interface. Simple SCPI-inspired ASCII commands can be used by existing SW environments to control the system.

Optional the system offers a graphical user interface (GUI). All attenuator parameters and even transition scenarios can be set via the GUI quasi-simultaneously by all laboratory workers individually for their respective seats.

Optional AM and GNSS signal injection

The TSI-6X32H system can be extended to provide also AM and GNSS simulated signals to every laboratory seat. These extensions fit physically into the same 19" rack and provide corresponding simulator inputs for AM and GNSS. The AM and GNSS signals are carried over the same coaxial cable together with the composite FM/DAB signal, not requiring any additional cable installation in the laboratory.

A typical setup could provide all 32 seats with GNSS signals and e.g. 8 seats with additional AM signals. Varying configurations are possible.

Table-top adapters for laboratory seats

Becker Nachrichtentechnik GmbH provides compact table-top adapter devices that take in the

composite signal and provide a number of outputs corresponding precisely with the antenna inputs of infotainment devices. The functionality of the table-top adapter goes beyond demultiplexing the various frequency bands, but also includes active antenna simulation through fixed (FDMX) or variable (FDMX-PT) DC loads. The table-top adapters are delivered together with a cable set, that fits the infotainment device (e.g. with fakra connectors).

As a result of using the TSI-6X32H infrastructure and the FDMX table-top units, the infotainment device or car radio will work as if it was in a real car environment with all its active antennas and radio signals that vary in signal level as if the car was travelling on the road.

RF Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
impedance	Z_{in} / Z_{out}		50		Ohm	
number of RF inputs	n_{IN}		6			
low frequency	f_{min}			100	kHz	
high frequency	f_{max}	2500			MHz	
number of outputs	n_{OUT}		32			FM, DAB
gain	$S_{21FMDAB}$		-8		dB	@ 0 dB ATT
level adjustment range	Δa	0		-80	dB	
level step size	da		0.25		dB	
RF connectors	X	N female				RF generator inputs
		N female				outputs
Option 1		AM Injection to 8 Channels				
inputs	X	1				
RF connector	X	N female				
gain	S_{21AM}		-8		dB	
Option 2	X	GNSS Injection to 32 Channels				
inputs	X	1				
RF connector	X	N female				
gain	S_{21GNSS}		-28		dB	

Common Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
power supply	U_{AC}	90	230	260	V	50 / 60 Hz
power consumption	P		400		W	
power plug		type „F“ CEE7/4				
dimensions	W x H x D	approx. 600 x 1800 x 800			mm	19", 38 U
weight			100		kg	
remote interface		RJ45 10/100BaseT				ASCII commands
operating temp. range	T_o	+ 20		+ 30	°C	within specification
storage temp. range	T_s	- 40		+ 70	°C	
EMC		EN61326-1:2013				according directions: 2014/30/EU
safety		EN61010-1:2010				according directions: 2014/35/EU
Ordering information	P/N	1801.1012.1	TSI-6X32H			6X32 FM/DAB Handover System
	P/N	1801.1012.O1	TSI-6X32H-AM			Option 1: 8 Channel AM injection
	P/N	1801.1012.O2	TSI-6X32H-GNSS			Option 2: 32 Channel GNSS injection

Related Products

Product	Description	P/N
FDMX	De-Multiplexer for Broadcast and Navigation Signals with fixed DC loads	1310.6003.1
FDMX-PT	De-Multiplexer for Broadcast and Navigation Signals with programmable DC current sinks, USB remote interface	1310.6003.2



FDMX offers fakra connectors for dual AM/FM, DAB, DVB-T, GNSS and SAT (SDARS) for DUT connection. Each input has an internal DC load for phantom supply.

For intensive phantom supply tests, the variant FDMX-PT offers programmable current sinks 0...300 mA at each input.

The signal mix of AM, FM, DAB, DVB-T, GNSS and SAT is fed into the FDMX over with a common input. Inside the FDMX the signals are separated into the different broadcast bands.