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DRM MONITORING <u>RECEIVER</u> DT700



PROFESSIONAL MONITORING RECEIVER FOR DRM



The architecture of the DRM Monitoring Receiver DT700

DRM Monitoring Receiver

- Stand-alone operation High-reliability hardware built for continuous operation
- Well-tested DRM receiver software based on Fraunhofer Software Radio
 - Easyto use due to comfortable LCD menus
- Full remote control via remote PC and Ethernet Easysoftware update via built-in DVD drive

Applications

- General Purpose DRMI AM/SSB Reception
- High performance front end
- Transmitter Monitoring
 - Modulation quality measurement (up to 40 dB SIN) Modulation parameters
 - Two configurable alarm signals (relay switch)
- Spectrum Monitoring
 - Spectrum plot with default DRM parameters
 - Span up to 60 kHz

- Monitoring Networks
 - Full remote control via LAN
 - Logging of RSCI
 - RSCIoutput (compatible to ETSITS 102 349 V1.2.1) via LAN
 - Alarm signals configurable with trigger conditions (e.g. audio dropouts or field strength)
 - QoS (Quality of Service) monitoring
 - Highly accurate field strength measurement

concept

The DRM Monitoring Receiver DTIOO is a professional monitoring receiver perfectly suited for DRM reception and transmitter monitoring. It features a high-performance front end based on a direct sampling reception technology. Together with a 12-band fix-tuned preselector filter bank the DRM Monitoring Receiver DTIOO guarantees an outstanding reception performance and low phase noise. The receiver's signal processing is based on a Software Defined Radio (SDR) construction the core of which is an embedded Linux Pc. The latter features an easy software update via built-in DVD drive. Based on the embedded Linux platform a web server allows for easy remote access to all of the receiver's control functions.

The DRM Monitoring Receiver DTIOO is available as Basic Model B1 or Basic Model B2

Basic Model B1

- DRM Monitoring Receiver stand-alone unit for the monitoring of DRM signals
- Accuracy of internal reference oscillator 5 ppm

Basic Model B2

- DRM Monitoring Receiver as listed above
- Built-in high-accuracy OCXO reference oscillator (Oven Controlled Crystal Oscillator)
 - Offset < 0.1 ppm
 - Aging < 0.1 ppmlyear
 - 10 MHz reference input for GPS synchronization

Mechanical Specifications

- Width 43.2 cm
- Height 13.3cm, 14.5cm with pedestals
- Depth 40.6cm, 46cm with connectors
- Weight 10 kg
- 19" rack mounting possible

Environmental Specifications

- Temperature range 0-40° C
- Humidity: 20-80% non-condensing
- Voltage range 110-230 V, 50-60 Hz AC

Interfaces

- Headphones output with volume control
- Built-in loudspeaker with volume control

- Output for external loudspeaker
- Line output

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- Two relay outputs
- Ethernet 100 Base T-port
- Two RS232 connectors
- Two USB 2.0 connectors
- Antenna input N type female connector with 50 Ohm

RF Front-end

- Input frequency range 100 kHz to 27.4 MHz
- 12-band fix-tuned preselector filter bank
- Level measurement accuracy ±1dB true RMS
- RFdata bandwidth 40 kHz, ripple 0.2 dB
- DRM spectrum mask monitoring within ±30 kHz
- Input level -110 to 20 dBm for DRM decoding
- In-channel IP3 +15 dBm (noise figure 15 dB)
- Out of band IP3 +30 dBm (noise figure 15 dB)
- Phase noise at ± 20 Hz: -80 dBc/Hz
- Phase noise at ± 20 kHz: -130 dBc/Hz
- Spectral inversion of input signal possible

DRM Receiver

- DRM parameters according to ETSIES201 980 V2.1.1
- 4.5,5.0,9.0,10,18 and 20 kHz
- Modes A, B, C and D
- QAM 4,16,64
- All code rates
- EEPand UEP
- Hierarchical modes
- Simulcast modes
- Audio decoder (decoder technology licensed by Dolby)
 - MPEG-4 AAC + SBR
 - HVXC + SBR
 - CELP+ SBR

Remote front panel executable on Windows and Linux pes



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Monitoring

Display, recording and online UDP output (RSCI)of Field strength (antenna factor can be specified) Estimated signal-to-noise ratio Estimated delay spread Estimated Doppler spread Audio quality Frequency offset

Scripts for the conversion of RSCIfiles into Comma Separated Value (CSV) files for further processing with a spreadsheet or graphics program

Location information via external NMEA-compliant GPS receiver Interface: RS232 or USB RSCloutput contains GPS information (TAG rgps)

Display of Power spectrum Channel impulse response

Field strength Signal-to-noise ratio

Alarm

Two independent alarms (associated with relays) configurable to multiple trigger conditions: Spectrum mask violated above specified level RFlevel below specified value SIN level below specified value Audio dropouts above specified ratio Audio level below specified value MDI errors above specified rate Frequency offset above specified value (Basic Model B2)

Remote Control

Via graphical user interface Via RSCI(Receiver Status and Control Interface) Via web interface

Remote access via web browser

Exemplary Screenshots

Alarm configuration screen allows enabling and setting of limits for each alarm condition

Alarm	1 Config	juration	٦		
Condit En Ac o o o o o o o o o o	ions: Conditic Spec Fai RF lev S/N lev Aud drop MDI err ServID	n Li	imit ØdB ØdBm ØdB ØdBFS ØdBFS	Dur. 1 s 1 s 5 s 1 s 10 s 1 s	Current -5.8dB -23.2dB 45.0dB 0% -18.7dB 0% Service
Action	: Relay 896 kHz	1 on, PL Synd	hold f	or 10	sec 45.0 dB
RF: -2	2.2 dBm	Atti	n: 6 (PÛ:	52% hd

Spectrum screen features display of DRM IAM spectrum mask

-20 -

Monitoring	screen f	eatures
display of i	important	DRM
parameters		

-40 -				i the	• •	-					Ave	rag	je:	10
-60·											Mod	:	DRM	1
-80 ·		•	منر	1				•			BW:	ew	BW	KHZ
-100	_	-		J		-	-		-	-	√Vi	ew	Mas	k
-120										•		-22	2.2	dBm
	-20		-10			•	10		20	•		s k- . :	4	dB
DRM	15 -2	89 2.	6 k 2 c	Hz Bm	PL	. 5	iyn tt	c: n:	FSA	SI	NR:	46	5.3	dB

SPECTRUN

Monito	pringD	RM-Mul	tiple	×		Carlos and	
Mode: RfBw:	B 10.0	kHz	SDC: MSC:	16-QAM 64-QAM	sta	ndarc	
Inter Codera Audio Date/	leaver ate (H ⁄Data: Time (ĎA∕B: UTC):	long 0.00 1/1 s 2004-	(2.0 se 0.50 ervices 07-28 1	0.60 1:4	0 3	
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DRM 1 RF: -	5896 k 22.5 c	Hz PL Bm	Sync: Attn:	FS- SNR 6 CPL	}: ;	44.7 50%	dB

Scheduler for automatically controlled monitoring of transmission slots

Scheduler			11:13:33 UTC
Enable:	0n	State:	Init
Start: End: Day: Frequency: Mode: Alarms: Recorder: ServiceID:	Current 11:00:00 12:00:00 Thursda 15545.00 DRM off PCM rsc off	Slot: UTC UTC WTC MO kHz	Next Slot: 12:00:00 UTC 12:15:00 UTC Thursday 26000.000 kHz DRM off PCM rsciA off
DRM 15545 RF:-102.7	kHzPLS dBm A	ync: ttn: 6	SNR:-128.0 dB CPU: 48% hd

For further information, please visit

WWW.IIS.FRAUNHOFER.DE/DRM

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Price	List (as of Februar	y 11th, 2010)		Subject	Price		
DRM	Monitoring	Receiver	DT 700	Basic Version B1 DRM Monitoring Receiver stand- alone unit for the monitoring of DRM signals. Various alarm functions, high- performance front-end.		12 000	EUR
				Basic Version B2 DRM Monitoring Receiver as listed above, with built-in high accuracy OCXO reference oscillator (Oven Controlled Crystal Oscillator) and 10 MHz reference input, e.g. for GPS synchronization		15 000	EUR

Accessories:

A 1 Transport Case	700	EUR
A2 Jog Wheel	450	EUR

	Availability of equipment 3 months after receipt of order
	Forwarding expenses will be paid for by Fraunhofer liS
	No tax included. Possibly occurring duties and customs fees have
tute	to be taken care of by buyer
ircuits IIS	This non-binding list is subject to change without further notice,
	errors excepted
33	The "General Terms and Conditions for Research and
Germany	Development Contracts of the Fraunhofer-Gesellschaft" exclusive
	of paragraph 5.3 shall apply to all business relations between
	Fraunhofer Institute for Integrated Circuits and its customers, as
nz Gerhauser	defined at the time of conclusion of the contract
	The standard warranty period of 2 years for the DRM Monitoring
+49 (0) 91 <i>31/776-6345</i>	Receiver DT 700 constitutes an adjustment to the warranty period
-49 (0) 91 31/776-6399	noted in the "General Terms and Conditions for Research and
s.fraunhofer.de	Development Contracts of the Fraunhofer-Gesellschaft", §9,
er.de	Statutes of Limitation, first sentence

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