MCT Solutions

Multichannel solutions
Up to 7+1 Channel Transmitters and Gap Filler

MCT SERIES

Multichannel Transmitter Solution (up to 7+1 channels). Three different models:
- ## Transmitter with SAT RX.
- ## Transmitter with SAT RX + ASI (Seamless).
- ## Gap Filler with echo canceller.

Two version hardware configurations: 4RU & 2RU.

> MCT 050UB 7+1 (4RU Configuration)

> MCT in 2+1 Configuration (2RU)

Key Features

- Multichannel Transmitter/Re-Transmitter with built-in automatic changeover.
- Available with 3 different models:
  - Transmitter with Satellite Receiver and Decoder.
  - Multi Input (ASI+ SAT) Transmitter Seamless Switching.
  - Gap Filler with echo cancelling.
- Available Output Power: 2, 5 and 10W rms.
- Available in 2 different hardware configurations:
  - 4RU configuration: up to 7 x transmitters, 1 x Reserve, 2 x GPS Boards, 1 x Main Board
  - 2RU configuration: up to 2 x transmitters, 1 x Reserve, 2 x GPS Boards, 1 x Main Board
- Multi-standard (DVB-T/H) modulator.
- Linear pre-correction with preloaded tables or graphical setting.
- Non Linear adaptive pre correction.

Management

- N+1 redundancy system with up to 7 main devices and 1 reserve.
- GPS plug-in boards (redundancy as option).
- Redundant power supply (as option).

TRANSMITTER with SATELLITE RECEIVER

SAT RX w DEC with CAM

SAT > DEC > TS > RF

INPUT
- 1 x Satellite receiver for DVB-S/S2 standard (support multi-stream, PLS scrambling function) with common interface for de-scrambler and MPEG-2/H264 - AVC decoder.
- GPS Receiver Board.

TRANSMITTER with SATELLITE RECEIVER + ASI INPUT (SEAMLESS)

TRANSMITTER

ASI > MOD > RF

SAT RX w DEC with CAM

SAT > DEC > TS > RF

INPUT
- 1 x Satellite receiver for DVB-S/S2 standard (support multi-stream, PLS scrambling function, BISS-1) with common interface for de-scrambler and MPEG-2/H264 - AVC decoder.
- 1 x ASI Input with standard BNC connector.
- Input seamless switcher control technology.
- GPS Receiver Board.

GAP FILLER with ECHO CANCELLER

S.F. HETERODYNE TRANSPOSER w ECHO CANCELLER

RF > IF > ECHO > RF

INPUT
- RF Input with N connector.

DVB-T DVB-H   PAL

ATSC   > Gap filler/Translator only

ALL VERSIONS OUTPUT

- Multiple RF channels: up to 7 channels can be frequency multiplexed to output.
- Full UHF Band, frequency range 470-860Mhz.
- 2 - 5 - 10W rms output nominal power in DVB-T/H standard.
- 1PPS and 10 MHz (for each GPS board).

ScreenService

Available models

| Versions	Board	MODELS		
		Transmitter with SAT RX	Seamless	Transposer / Gap Filler w Echo Canceller
4RU	TX	from 1 + 0 up to 7 + 1	from 1 + 0 up to 7 + 1	from 1 + 0 up to 7 + 1
	GPS	up 1+1	up 1+1	-
	Meter	1	1	1
	SAT disributor	1	1	-
	ASI matrix	-	1	-
2 RU	TX	from 1+ 0 up to 2 + 1	from 1+ 0 up to 2 + 1	from 1+ 0 up to 2 + 1
	GPS	up 1+1	up 1+1	-
	Meter	1	1	1
	SAT disributor	1	1	-
	ASI matrix	-	1	-

N+1 Redundancy

Complete interchangeability among transmitters boards from the 4RU to 2RU versions and viceversa.

The MCT Series is composed by N (up to 7) transmitters and 1 Reserve. Each device stores its own operating set of parameters, used to define for example modulation mode, output channel, input satellite settings and modulation. It also stores all the other transmitter configurations. This ensures better spare part management and logistics. The scope and the hierarchy of each Transmitter board is defined by its position in the chassis.
One transmitter is used as a reserve: it stores all the other transmitter configurations in order to provide redundancy in case of failure of one of the main transmittersothers. The reserve transmitter is normally in stand–by mode waiting to be enabled from a failure signal coming from one of the main transmitters.
Each device uses a keyword (magic number) that enables the device to work in the system. New blades have default invalid values that are set to valid only after the proper configuration of the device itself is performed.

MCT SEAMLESS 7+1 BLOCK DIAGRAM
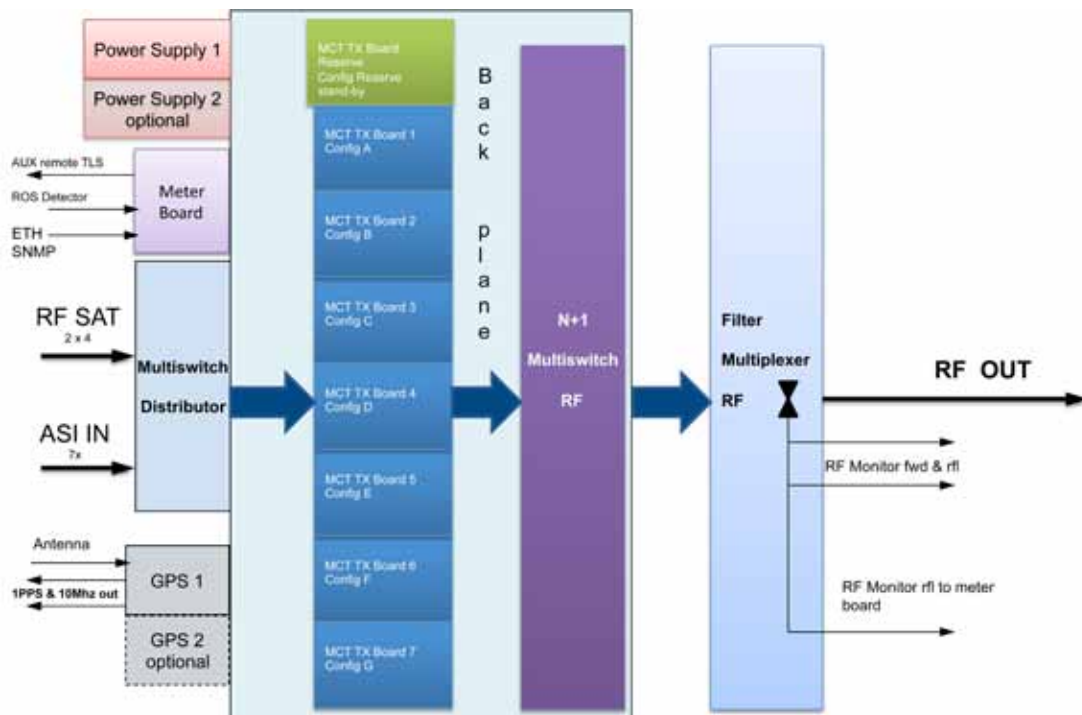
Solutions available

Complete interchangeability among transmitters boards from the 4RU to 2RU versions and viceversa.

Configuration 2 + 1.
This solution offers 2 +1 reserve transmitters and redundant GPS boards*.

Configuration 2 + 0.
This solution offers 2 transmitters and redundant GPS boards*.

Configuration 1 + 1.
This solution offers 1 +1 reserve transmitters and redundant GPS boards*.

Configuration 1 + 0.
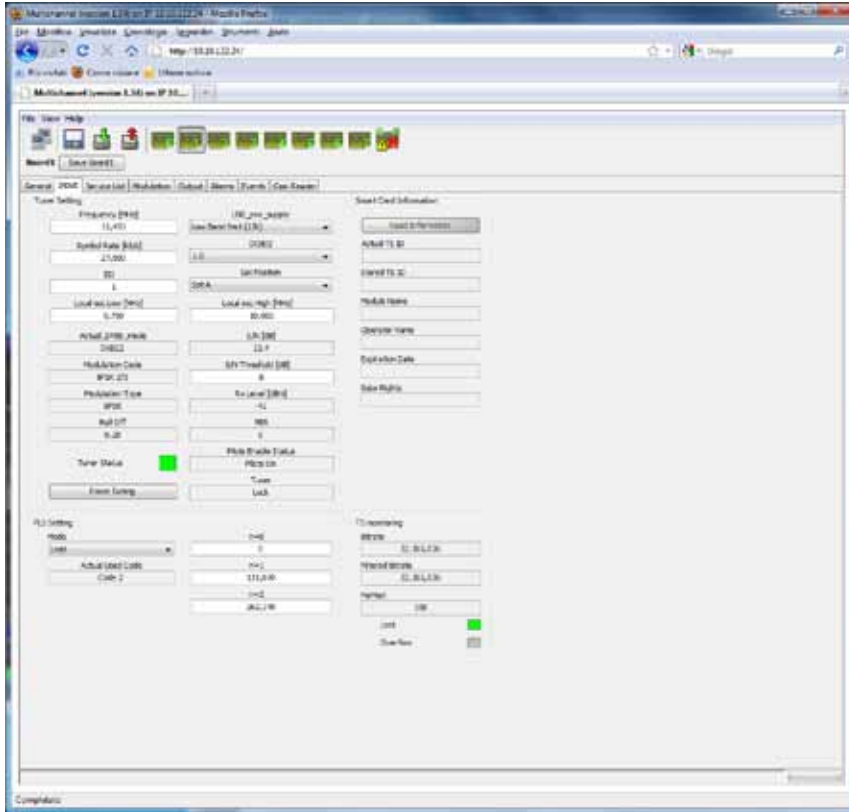This solution offers 1 transmitter and redundant GPS boards*.

Gps Redundancy board is an option

ScreenService

Java interface

Intuitive and user friendly java interface to set and control through SNMP or WEB browser any parameter , alarm or status.

Hereafter follows an example of common list of alarms or status:
- Satellite input not locked –> The satellite input signal did not lock.
- Satellite input high BER –> A BER higher than a programmed threshold was measured in the sat input signal.
- Satellite input low S/N –> A S/N lower than a programmed threshold was measured in the satellite input signal.
- No input TS –> a valid TS was not found at the descrambled input of the modulator.
- De-scrambling error –> the receiver returned error while de-scrambling.
- Input service not found –> the service selected is not valid or no more present in the input TS.
- Failed device enabling –> the device has an incorrect keyword and needs to be re-configured before being enabled.
- 10 MHz clock alarm –> the 10 MHz failed to lock to the external 10 MHz.
- 1 PPS alarm–> 1 PPS external signal was missing.
- System delay alarm –> the system cannot lock its internal reference timing to the STS received from MIP and cannot perform a correct SFN transmission.
- No MIP alarm–> a valid MIP packet was not found in the input TS.

MCT "Transposer/Gap-filler with echo canceller" model

TV signals from a master transmitter can be rebroadcast directly so that small gaps in the network can be filled easily. Network operators can also use the TV transposer / gap filler for the regional expansion of networks where the installation of additional transmitters would be too expensive.
The MCT gap filler rebroadcasts off-air signals directly from the master transmitter, without requiring complex signal feed and modulation. The network coverage of digital transmission equipment can therefore be expanded quickly, easily and above all according to requirements.
Screen Service MCT use the fold back settings techniques in order to guarantee the right balance between echo level input and output quality of signal.
Gap fillers can be used in wide area SFN networks to implement a variety of use cases:
MCT "Transposer" model

- To cover black spots on specific areas, whenever deemed necessary
- To increase signal coverage and quality in specific urban areas
- To extend coverage in high power transmission areas
- To limit or eliminate interference effects generated by multipath signals
- Improve Indoor and Mobile Penetration/Coverage for Mobile DTV Service

MCT "Transposer/Translator" model

The MCT provide efficient and reliable re-broadcast of the received signal in a small and robust package, is a high quality TV transposer family providing digital terrestrial transmission of TV programs using the traditional transposer method with off-air reception and non re modulation broadcasting. This range is equally suitable for any kind of DVB standard like DVB-T/T2, ATSC , ISDB-T, DTMB

MCT "Gap-filler with echo canceller" functional working

The MCT receives as input an RF signal even with low signal quality (even -80 dBm). The RF input signal is converted into a standard 36 (44) MHz IF frequency by a fully agile down converter. This signal is digitally filtered, elaborated, pre-corrected and then presented at 996 MHz to the channel converter.
The channel converter provides to generate the final frequency in a fully agile mode. The LO with a very low phase noise is locked to the 10 MHz reference.

The signal coming from the agile up converter goes to the RF amplifier section. The RF amplification is done by class A and AB stages.
Out of the final stage, the RF signal passes through a directional coupler. The directional coupler detects samples of direct and reflected power and passes this information to the check function.

MCT "Gap-filler with echo canceller" main features

- Powerful adaptive echo cancellation with up to 17 dB gain margin (12dB for exposed stations and difficult situations)
- Broadband, frequency agile design – UHF 470 to 862 MHz

Low Time Delay:
- MCT gap-filler time delay is less than 10 uSec and the echo cancellation window is 20 uS max (Equipment time delay not included)
- A low time delay allow the receiver to deal with two different signals (main transmitter and MCT) without allowing them to interfere with each other and degrade reception.
This range is equally suitable for any kind of DVB standard like DVB-T/T2, ATSC, ISDB-T, DTMB

Echo Canceller:
- Screen Service digital signal processing algorithms offer a superior cancellation, it means that stable operation can be achieved even with a feedback (undesired) signal that is larger than the incoming (desired) signal!
- MCT performs at significant output power levels.
- Linear Pre correction
- AGC (Automatic Gain Control) for Power Limitation
- Powerful adaptive echo cancellation with up to 17 dB gain margin for expo sed stations and difficult situations
- Very low processing delay, ideal for short guard intervals in COFDM
- Digital IF filter for maximum adjacent channel suppression
- Digital, tunable RF input filter
- Full remote control capability including:
- Web-based HTML GUI interface
- SNMP

- Parallel control/monitoring

MODEL SPECIFIC DATA											
Models	Output Band	Working Class	Dimensions	N. Tx	Output Connector	Cooling	Meter board N.	MER	Shoulders @ Fo ± 4.3 MHz	Digital output power (rms) without Filter DVB
MCT050UB 2	UHF	A	2/4 RU	2+1 (7+1)	N	Air	1	>36dB	–39	2W
MCT050UB 5	UHF	A	2/4 RU	2+1 (7+1)	N	Air	1	>36dB	–36	5W
MCT050UB10	UHF	A	2/4 RU	2+1 (7+1)	N	Air	1	>36dB	–36	10W

Specifications and characteristics are subject to change without notice.

Satellite receiver

Standard:	ETSI EN 300 421 (QPSK) (DVB-S)
	ETSI EN 302 307 (QPSK, 8PSK, 16APSK) (DVB-S2)
	ETSI EN 50083-9 (ASI)
	ETSI EN 50221 (Common Interface)
DVB-S2:	VCM, CCM, Multi Stream and Single Stream, Normal & Short FEC frames
Symbol Rate:	1 – 45 Msymb/s (DVB-S)
	2 – 45 Msymb/s (DVB-S2)
Constellation:	QPSK, 8PSK, 16APSK
FEC:	Automatic, all modalities available according to the standard.
	Block Short or Normal
	DVB-S: Reed-Solomon (204,188)
	DVB-S2: BCH, LDPC
Roll–Off:	0.2, 0.25, 0.35
Input connector:	F (f), 75 Ohm
Frequency:	L–band 930÷2250 MHz
LNB control voltage:	Off, +13/18 Vdc, 22 kHz, 0.25 A (overload protection)
RF input level:	40 ÷ 100 db/μV (with attenuator)
Output connector:	BNC (f), 75 Ohm
Modality:	188 bytes
Max input bit rate:	80 Mbps (CAM limit: 72 Mbps)
CAM interface:	PCMCIA DVB-CI Common Interface
CA mode (Conditional Access):	Multicrypt, Simulcrypt
CAS Support:	Mediaguard, Viaccess, Irdeto, Conax, BISS–1 with Professional multiprogram CAM (descrambling of up to 24 Elementary Streams) Betacrypt, Cryptoworks, Nagravision with standard consumer CAM (descrambling of up to 4 services)

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Other specs

Chassis:	4U rack 19"
Width:	482 mm
Height:	177 mm
Depth:	420 mm without fans
Weight:	25 Kg

Operating Temperature Range:	–5°C ÷ 40°C
Max. relative Humidity:	90%, non condensing
Max. operating altitude:	2500 m. a.s.l. (>2500 m. optional)

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