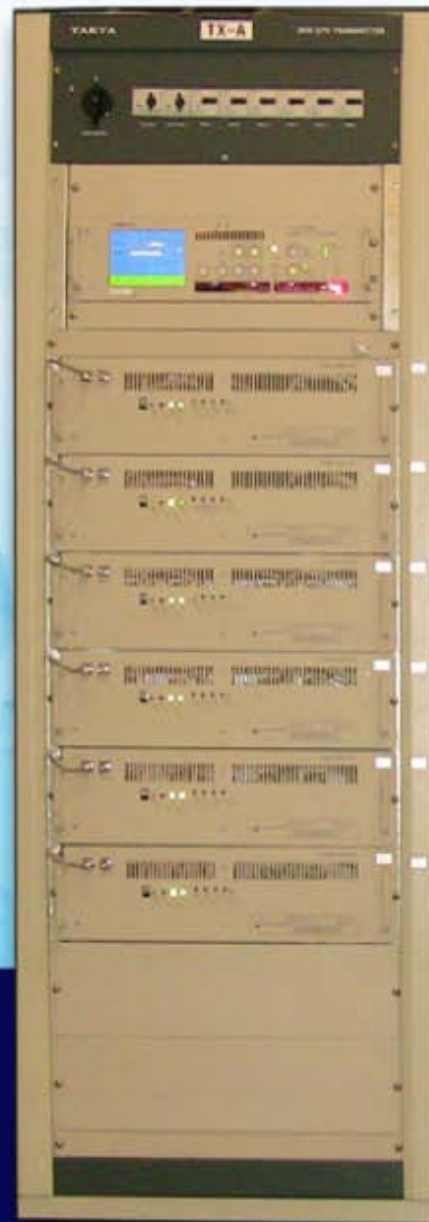




TAKTA
ELECTRONIC RESEARCH &
PRODUCTION Co.
I R I B

TKP -86 Series High - Power DVB-T/T2 Digital TV Transmitter



Main Features

- Small footprint
- Advanced liquid cooling system
- High efficiency
- Remote control / monitoring
- Empowered by adaptive digital correction (ADC)

Main Features of Transmitters at a Glance



More than 35 years of experience

Takta Co. has many years of experience in production of solid-state transmitters. We have successfully developed High-Power digital TV transmitting equipments which have easy maintenance and high performance characteristics. The TKP-86 Series consist of 1.4kw, 2.1kw, 2.8kw, 3.5kw, 4.2kw, 4.9kw and 5.6kw with liquid-cooled technology and can be mounted in a 42U rack and a separated pump rack.

Easy Channel setting

The TKP-86 Series have been equipped with a synthesized local oscillator that covers the entire UHF band and automatic tuning for any UHF channel through internal upload setting. It means that there is no need to tedious manual adjustments for channel changing.

Advanced cooling system

With the adoption of Semi-Closed and Semi-Opened System for cooling, there is the advantage of excellent cooling liquid exchangeability and automatic removal of air from the system when an amplifier is changed.

Wide range of redundancy configuration

To meet customer's ever increasing demands, the TKP-86 Series can offer wide range of backup options: from redundancy only in the liquid cooling system to N+1 configurations.

Wide band design

The TKP-86 Series is designed to be frequency-agile, covering the entire UHF band and thus, no channel-specific components are required

Power Amplifier (PA)

The TRPA-800QC Power Amplifier utilizes the latest high power LDMOS (NXP BLF888A), high gain, realizing compact design, enhanced efficiency and producing excellent reliability. Each PA can produce an output power of 800W average and equipped with a switching power supply. Furthermore, it features an optimized combination of wideband matching circuits and controls. Safety features accomplished by a RS-485 interface, enabling comprehensive monitoring and remote control functionality. With the added benefit of self-protection circuits to protect against external factors such as high temperature, reflected power, low AC voltage and internal factors such as over voltage and over current. Additionally, the PA is equipped with RF over drive protection, which has a function of protecting the PA against excessive output power produced from the exciter due to human fault and from the excessive input power in case there is malfunction in the divider. All the parameters setting have been done in factory for any channel.



TRPA-800QC Power Amplifier

Exciter

The compact TKP-2000A DVB-T/T2 digital exciter is packed with TAKTA state-of-the-art technology. A synthesizer is tuned to all UHF-band signals enabling full-band direct conversion to RF output. Higher or lower bit rates are modified to usable bit rates for flexible bit-rate adaptability. Using the MIP created by the SFN adapter, seamless ASI switching can be performed.

Features:

- Supporting both DVB-T and DVB-T2
- TX-Control embedded
- 5.7" touch screen display for monitoring and configuration.
- TR101290 First Priority monitoring of MPEG-2 TS inputs
- Sophisticated management of input substitution(redundancy switching)
- Adaptive Linear and non-linear pre-correction (ADC) for optimization of transmitter performance
- Frequency agile RF output supporting any frequency from 30mhz to 1000mhz insteps of 1Hz
- On-Line SW/FW upgrading via Ethernet



TKP-2000A DVB-T/T2 digital exciter

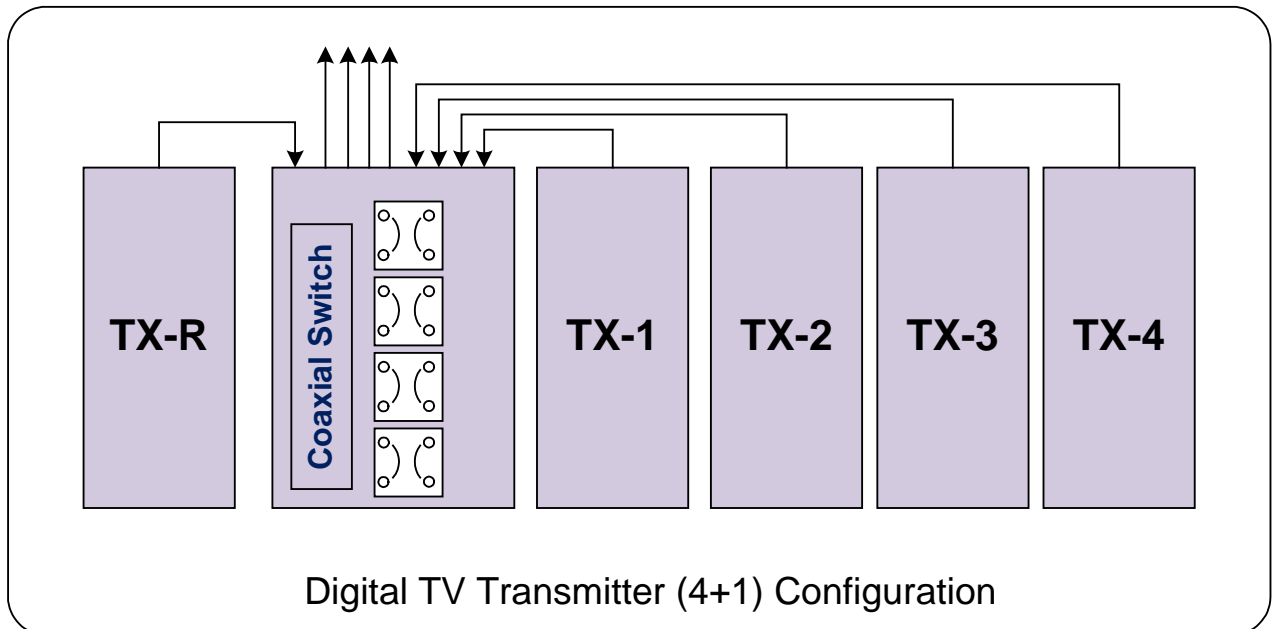
Adaptive Digital Corrector (ADC)

Feeling more empowered

The ADC automatically generates correction factors of non-linearity and linear distortion and updates the correction table without interrupting program service. Optimum signal quality and service coverage are guaranteed, protected from the effects of ambient temperature, aging and other factors. The ADC comes integrated in the TKP-2000A Series Digital Exciters and can be used to generate the correction factor for preset correction. Furthermore, the ADC is capable of analyzing feedback signals from the TX output, including inter-modulation level and other graphical data. Automatic adjustment of the IMP/MER values greatly reduces the time required for maintenance.

N+1 System

The TKP-86 Series frequency-swift design, allows for the construction of an N+1 system, providing redundancy for maximized reliability and change over time. By using the latest N+1 controller, up to 4+1 system are available. At any given time, there is a transmitter ready to be activated if one of the active transmitters malfunctions. When activated, the spare transmitter adjusts its frequency channel accordingly without interfering with broadcast signals.



Liquid Cooling System

This equipment is a pump rack for liquid-cooled digital TV transmitter. It is equipped with automatically switchable dual pumps, thus realizing high redundancy safety.

Features:

- (1) Hybrid closed circuit
(Semi close and semi open)

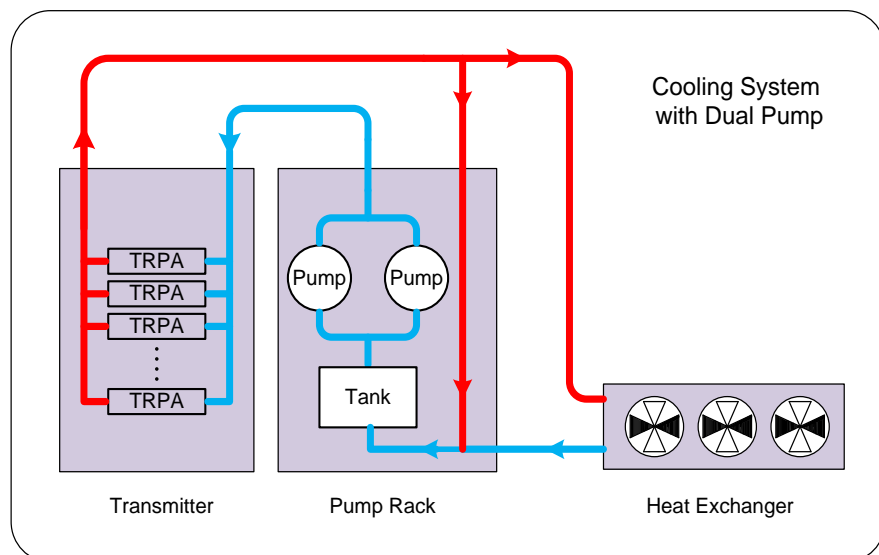
The adoption of a hybrid type of closed circuits having advantages of both the closed and open circuits that realized high stability of the closed circuit and good operability (in coolant feed, air purge, PA replacement and so on) of the open circuit in a simple system.

- (2) Automatic switching of dual pumps

Two pipes of pumps are automatically switched for current use and spare. Manual switching is also possible.

- (3) Compact size

The pump rack for the UHF 3kW can be installed in a space of 600mm wide, 740mm deep and 2020mm high.

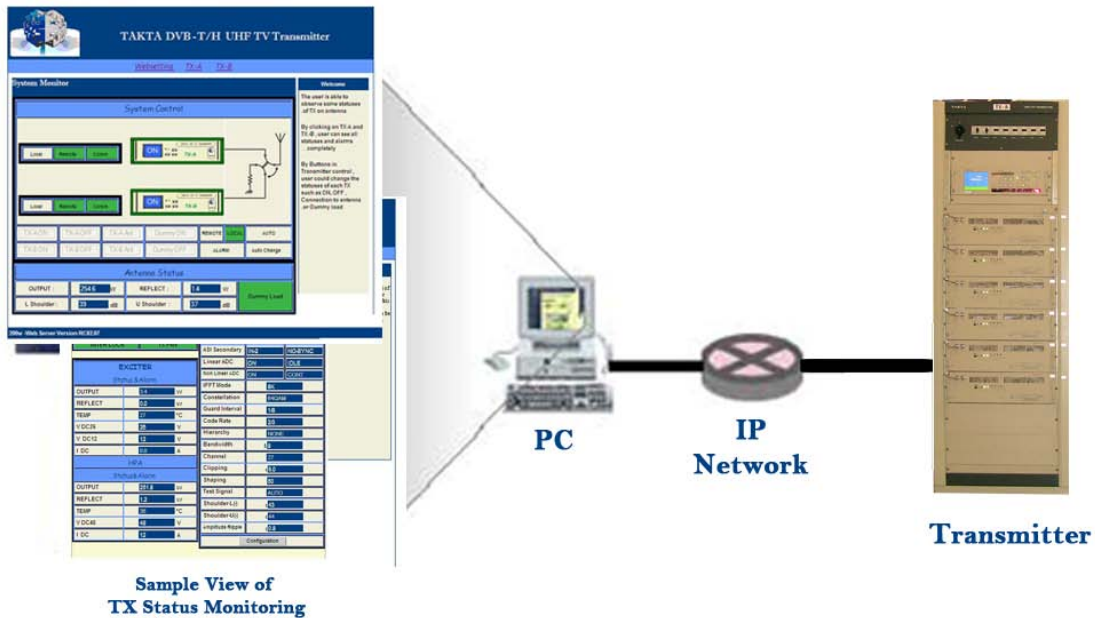


Local Control/Monitoring

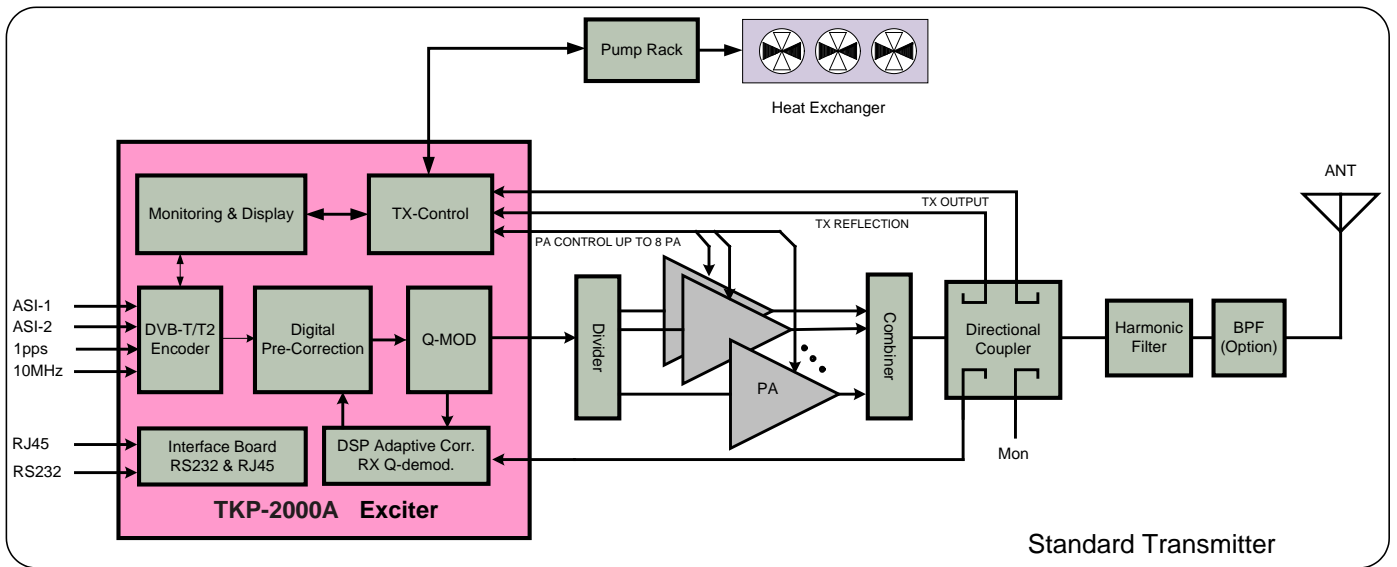
The easy-to-view color 5.7" LCD screen located on the front of the Exciter an intuitive GUI (Graphical User Interface), making transmitter control, monitoring and maintenance extremely easy to perform. The log data not only displays changes in operational status, including faults, but also enables verification of related data in case of system failure, thereby streamlining analysis of abnormal status. Frequency settings can be conducted at the touch of a button on the color LCD screen.

Remote Control/Monitoring

The TKP-86 Series incorporates a web server, enabling the transmitter to be connected to a local area network for monitoring and control of transmitter operations via a remote PC with a web browser. Whilst also allowing control from a different location at the same time. Thus, provide a cost-efficient maintenance, whilst the transmitter is in operation and without the requirement of expensive measurement equipment. Every Alarms and Warning signals can be monitored remotely.



Standard Transmitter



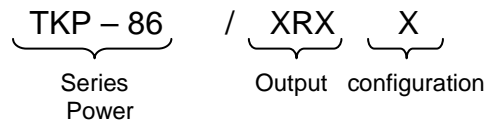
Configuration of TKP-86 (Liquid-cooled) Series

Output Power

Power	Type
10W	R10
50W	R50
100W	R100
200W	R200
400W	R400
700W	R700
1000W	1R0
1400W	1R4
2100W	2R1

Configuration

- S:** Single Transmitter with Single Exciter
- P:** Single Transmitter with Dual Exciter and Multiple PAs
- M:** Dual Transmitters with Passive Reserve Operation



Standard Transmitter Configuration Table

Output*	Model Name	Equipment Composition [Sets]						Size (mm)	Weight
		Exciter	PA	System Control	Pump Rack	Coaxial Switch Rack	HE*		
700w	TKP-6/R700S	1	1		1		1	666x1100x2050	160kg
	TKP-6/R700P	2	1		1		1	666x1100x2050	169kg
	TKP-6/R700M	2	2	1	2	1	2	666x1100x2050	240kg
1.4kw	TKP-86/1R4S	1	2		1		1	666x1100x2050	230kg
	TKP-86/1R4P	2	2		1		1	666x1100x2050	239kg
	TKP-86/1R4M	2	4	1	2	1	2	3x(666x1100x2050)	605kg
2.1kw	TKP-86/2R1S	1	3		1		1	666x1100x2050	246kg
	TKP-86/2R1P	2	3		1		1	666x1100x2050	255kg
	TKP-86/2R1M	2	6	1	2	1	2	3x(666x1100x2050)	640kg
2.8kw	TKP-86/2R8S	1	4		1		1	666x1100x2050	275kg
	TKP-86/2R8P	2	4		1		1	666x1100x2050	284kg
	TKP-86/2R8M	2	8	1	2	1	2	3x(666x1100x2050)	710kg
3.5kw	TKP-86/3R5S	1	5		1		1	666x1100x2050	304kg
	TKP-86/3R5P	2	5		1		1	666x1100x2050	313kg
	TKP-86/3R5M	2	10	1	2	1	2	3x(666x1100x2050)	768kg
4.2kw	TKP-86/4R2S	1	6		1		1	666x1100x2050	333 kg
	TKP-86/4R2P	2	6		1		1	666x1100x2050	342kg
	TKP-86/4R2M	2	12	1	2	1	2	3x(666x1100x2050)	826kg
4.9kw	TKP-86/4R9S	1	7		1		1	666x1100x2050	362kg
	TKP-86/4R9P	2	7		1		1	666x1100x2050	371kg
	TKP-86/4R9M	2	14	1	2	1	2	3x(666x1100x2050)	884kg
5.6kw	TKP-86/5R6S	1	8		1		1	666x1100x2050	391kg
	TKP-86/5R6P	2	8		1		1	666x1100x2050	400kg
	TKP-86/5R6M	2	16	1	2	1	2	3x(666x1100x2050)	942kg

- <Note> *1) BPF is option.
 *2) Output power level before reaching output filter.
 *3) HE means Heat Exchanger.

TKP-86 Series Specifications

Specification	DVB-T/T2	ATSC
Output Power	700W – 5.6kW	700W – 5.6kW
Output Frequency	470 - 862 (Band IV/V)	
Output Impedance	50Ω	
Input	ASI x 2 (in pairs, prepared for hierarchical)	SMPTE310 x 2
Power Supply Voltage	380/400/415 V, 3-phase, 4-wire	
Voltage Fluctuation	-15%, +10%	
Power Supply Frequency	50/60Hz ±2%	
Ambient Temperature Range	Indoors: 0°C to +45°C	
Operational Temperature	Outdoors: 0°C to +45°C or -30°C to +40°C (using antifreeze and 3-way valve system)	
Relative Humidity	90% (no condensation)	

Standard Performance	DVB-T/T2	ATSC
Frequency Stability	< ±1 x 10 ⁻⁷ /year (internal reference use) (it is also possible to lock an external 10MHz reference)	
Amplitude-frequency Response	< ±0.5dB (excluding BPF)	
Bandwidth	6MHz, 7MHz, 8MHz	6MHz
Intermediation Products	<-38dB (excluding BPF)	<-36dB
MER(Modulation Error Ratio)	<34dB (excluding BPF)	-
SNR(Signal to Noise Ratio)	-	>27dB
Spurious Emission	<-60dBc (including BPF)	Meet FCC Emission Mask with Output Filter
Pilot Carrier Phase Noise	-	-104 dBc/Hz @ 20 kHz offset



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