

# DTU-70D Series Liquid-Cooled Digital UHF TV Transmitter



# New concept transmitter with over a century of accumulated expertise in ICT

DTU-70D series are NEC high-power range digital TV transmitters newly developed on the basis of high technology of ICT and deep wisdom gained in a century of history of NEC. In addition to the “reliability” which has been extensively appreciated in the world, one of the essential elements, “high-efficiency”, has been added to this new model. NEC offers you DTU-70D with supreme confidence that surely fulfills your high-level expectations.

## New Concept of Doherty Transmitter

NEC has a rich experience in Doherty technology with the first NEC commercial-based transmitter with Doherty amplifiers manufactured in 2011 for Tokyo Metropolitan area, achieving drastic improvement in power consumption (more than 40% better than the existing model). NEC market share of Doherty TX segment in Tokyo has now reached to nearly 50%. And this time, by making the most of this brilliant experience, NEC proposes DTU-70D series with a new concept of Doherty transmitter for global customers.

The core philosophy of NEC Doherty transmitter is to enable the customer to always enjoy the best energy efficiency of each selected channel (up to 38%). By initially fixing the operational frequency of each PA unit into a single channel, DTU-70D achieves the most beneficial and appropriate form of Doherty transmitter. Once users become needed to change channel frequency, a bit of time and work will be requested. But the process is simple; only a few components of the amplifiers have to be replaced and it neither requires any special instruments nor skills. The customers may have to be asked to take such a little burden, but there is no more concern that the enjoyable performance would be fluctuated depending on the designated channel. Minimal lifetime cost solutions (both CAPEX and OPEX efficient) would be effectively ensured.

## How we realize “high-efficiency”

### Doherty Power Amplifier

NEC new Doherty amplifier, UX5000QF, has been developed to vigorously support the customer’s power-efficient operation. Each unit can produce approximately 1,500W of output power (average), and it can also greatly contribute to the cost and space saving.

UX5000QF employs LDMOS (Lateral Diffused Metal Oxide Semiconductors) output devices with protection and monitoring circuits, and strongly support the high linearity and reliability of DTU-70D series.

### Further Contribution to Energy Savings

As well as Doherty technology, various factors newly innovated for the NEC latest transmitters considerably contribute to significant improvement of energy efficiency.



DTU-70/16R5PQD  
with optional color LCD

# DTU-70D Series Liquid-Cooled Digital UHF TV Transmitter

Especially DTU-70D can achieve low accumulated power loss by following the excellent design which was dynamically improved for the previous model, DTU-70. Besides, total power consumption of the cooling system has been remarkably improved by renovation of its fundamental designs. These sophisticated skills are multi-laterally supporting stable performance with high energy efficiency.

## Digital Exciter

DTU-70D employs compact-designed (1RU size) and multi format digital exciter. All of the major standard (DVB-T/T2, ISDB-T/Tb and ATSC) are widely covered and flexibly meet the customer's request.



DM-5000

DM-5000 digital exciter has built-in GPS receiving function, and ready for SFN operation. The same unit can be also utilized for DTL-30, NEC low-mid power digital transmitter.

## Customer-oriented Design

### High density design

Cooling pump and band-pass filter can be carried in a single TX rack; this "built-in solution" can contribute to remarkable reduction of total footprint. This solution can be selected with the configuration carrying up to 5 sets of PA.

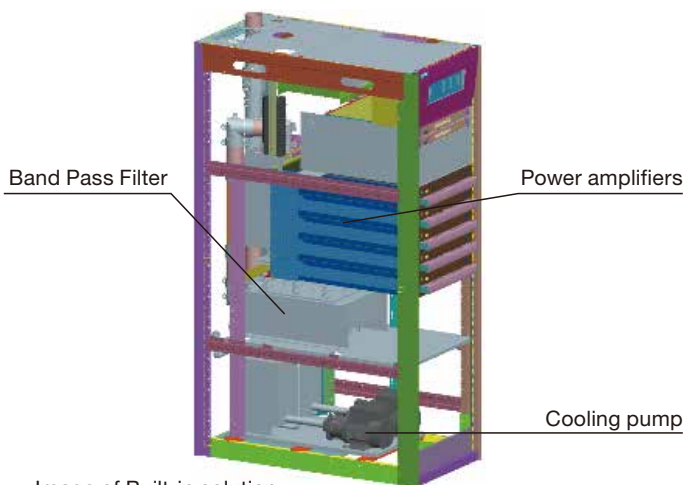


Image of Built-in solution

### Easy conversion between Doherty and Wideband mode

The flexibly designed power amplifiers for DTU-70D allows the customer to switch from high-efficiency mode to wideband operation through a little modification work. It could contribute to the savings in the number of spare amplifiers to be held.

### Cooling system with hybrid closed circuit

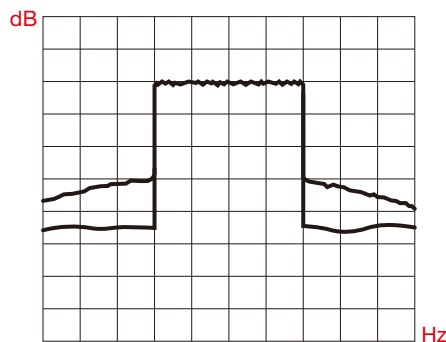
The liquid cooling system incorporates an automatic air-purge function and no external pump is requested to feed coolant. These features work together to cut noise and installation costs, making the maintenance easier and boosting reliability. Coolant feeding and dust removal have been greatly simplified by a hybrid closed circuit, ensuring the coolant remains clean.

### N+1 Configuration

Maximum 8+1 configuration can be constructed with NEC original controller. N+1 system must further boost up DTU-70D's reliable operation.

## Adaptive Digital Correction (ADC)

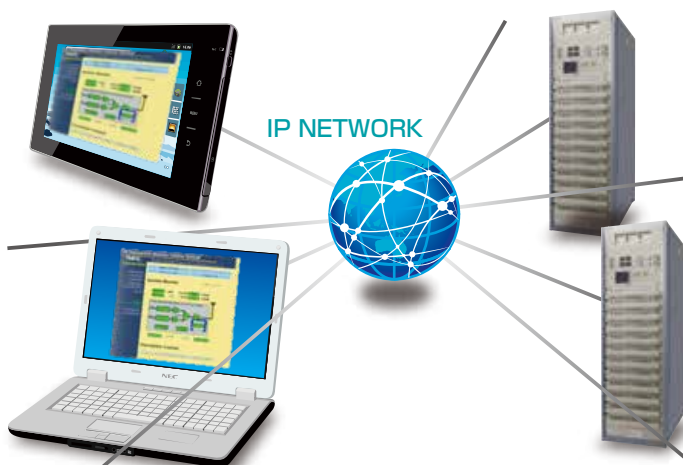
The adaptive digital corrector incorporated in NEC digital exciter has linear and non-linear pre-corrective function, and stably keeps signal quality and service coverage optimum. The reliability and stability of DTU-70D are strongly boosted up by this NEC performance advantage.



Sample of improvement by ADC

## Remote Control/Monitoring System

DTU-70D series is equipped with an IP network interface, the customer can easily access NEC transmitters through a web browser and remotely check the signal quality and actual status of the transmitters.



# DTU-70D Series Liquid-Cooled Digital UHF TV Transmitter

## Configuration Table

Output Power		Model Name*1 (Dual-exciter Type)	Equipment Composition [Sets]		
Doherty	Wideband		PA	TX Rack	Cooling Pump and BPF
2.9kW	2.5kW	DTU-70/2R9PQD	2	1	Built-in TX Rack
4.3kW	3.7kW	DTU-70/4R3PQD	3		
5.7kW	4.9kW	DTU-70/5R7PQD	4		
7.1kW	6.1kW	DTU-70/7R1PQD	5		
8.5kW	7.3kW	DTU-70/8R5PQD	6		
9.9kW	8.5kW	DTU-70/9R9PQD	7		
11.2kW	9.7kW	DTU-70/11R2PQD	8		
12.6kW	10.9kW	DTU-70/12R6PQD	9		
13.9kW	12.0kW	DTU-70/13R9PQD	10		
16.5kW	14.3kW	DTU-70/16R5PQD	12		

\*1: Single-exciter type is also available The power variations are the same as shown above.

## Specifications\*2

	DVB-T	DVB-T2	ISDB-T/Tb	ATSC
Output Power	2.9kW-16.5kW(2.5kW-14.3kW in wide-band mode) *1			
Output Frequency	470 - 862 MHz (Band-IV/V)			
Output Impedance	50Ω			
Input	2 x ASI, BNC 75Ω	2 x ASI (TS/T2-MI), BNC 75Ω 2 x IP	2 x ASI, BNC 75Ω	2 x SMPTE310/ASI, BNC 75Ω
Power Supply Voltage	380/400/415V, 3-phase 4-wire			
Voltage Fluctuation	-15%, +10%			
Power Supply Frequency	50/60Hz +/-2%			
Ambient Temperature Range	Indoors: 0°C - 45°C Outdoors: 0°C - 45°C, or -30°C - 40°C			
Relative Humidity (max)	90% (no condensation)			

\*2: Measured before mask filter.

## Standard Performance\*3

	DVB-T	DVB-T2	ISDB-T/Tb	ATSC
Frequency Stability	$\leq \pm 2.5 \times 10^{-7}$ (internal reference use) (it is also possible to lock an external 10MHz reference)			
Amplitude-frequency Response	$\leq \pm 0.5$ dB (excluding BPF)			
Bandwidth	6, 7, 8MHz	5, 6, 7, 8MHz	6, 8MHz	6MHz
Intermodulation Products	< -36dB	< -36dB	< -36dB	---
MER (Modulation Error Ratio)	> 32dB	> 32dB	> 32dB	---
SNR (Signal to Noise Ratio)	---	---	---	$\geq 27$ dB
Spurious Emission	$\leq -60$ dBc	$\leq -60$ dBc	$\leq -60$ dBc	FCC Emission Mask with Output Filter

\*3: The values shown above are our standard specifications for practical use and higher performance can be set on request.

ISO 9000 Series



ISO 9001 JMI-0119  
NEC Broadcast and Video

ISO 14001



JQA-E-90066  
NEC



### Safety precautions

To install, make connections and operate this product, please carefully read and observe instructions, precautions and recommendations in our instruction manuals.

● The colours in this brochure may differ from those of the actual unit. Designs and specifications of this product is subject to change without prior notice.

**NEC Corporation**  
Americas and Global Platform Division  
Europe, the Middle East and Africa Division  
Greater China and Asia Pacific Division

**NEC Europe Ltd.**  
Athens, Odyssey Business Park  
West End Road, South Ruislip,  
Middlesex HA4 6QE, United Kingdom  
Tel: +44-20-8836-2000  
Fax: +44-20-8836-2001

**NEC Asia Pacific Pte. Ltd.**  
No. 1 Maritime Square  
#12-10 HarbourFrontCenter  
Singapore 099253  
Tel: +65-6278-1818  
Fax: +65-6271-2088

**NEC Latin America S.A.**  
Av. Paulista, 2.300  
01310-300 Sao Paulo, SP  
Tel: +55-11-3151-7000  
Fax: +55-11-3151-7218

7-1, Shiba 5-chome, Minato-ku, Tokyo,  
108-8001, Japan  
Tel: +81-3-3798-5463  
Fax: +81-3-3798-6359

© 2014 NEC Corporation. NEC and the NEC logo are registered trademarks of NEC Corporation.

Cat.No. H99-13110002E-2