Illustrated below is a very low cost DTV repeater.

The key to this low cost design is the use of 75 ohm low cost antennas normally used for receive. The type and quality used for domestic installations. This repeater is for DTV only and re-transmits the signals on the same frequency. It is unsuitable if the receive antennas feeding the repeater are sited in a fringe area as there is no agc in this design and signal levels need to be stable with this configuration.

DTV works better on active deflectors as the isolation between the re-transmitted signal and the signal received directly from the main transmitter required for COFDM broadcasts are very much lower than for analogue broadcast. Plus COFDM has an antighosting function. Our research into this indicates that 21dB is sufficient.

Using several antennas for the transmission removes the need for antenna filters as using four antennas increases the ERP by about 6dB. This will enable the amplifier to be backed off by 6dB and reduce harmonic components by 12dB. Meeting out of band emission limits indicated in ETSI EN 302 296 V1.1.1. non critical application <25W -29dBm +/- 4.2MHz. This solution will not address every problem were the DTV signal is impeded by terrain. Processors, demod-remod with error correction and higher power will be required with more difficult reception problems. It does however offer a very low cost solution where a small number of dwellings require a service.

If overall amplifier gain 45 dB, Distance needs to be about 10m
If 65dB 100m

Path loss at 650MHz 500m =83dB 1km =89dB 2km =96dB

A 10 element antenna will provide 54dBuV at 500m less 6dB feeder loss =48dBuV at the TV

Use antenna with >17dB of gain at 1km or 115dB with a pre amp
Use antenna with >15dB of gain and a pre amp at 2km

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Items and prices subject to change without notice
UHF AMPLIFIER FOR TRANSMITTERS

If used for DTV without a mask filter the output levels may need to be reduced to meet European DTV regulations ETSI 302 296 V1.1.1 (2005-01).

TS1879U
UHF Class A \n1W pk sync
250mW COFDM DTV
peak average power *
Gain 18dB
Impedance 75Ω
Power requirment 15V 700mA
$422.00

*Power levels for DTV are calculated differently compared to analogue

Illustrated below in fig 1 shows the typical out of band intermodulation in the final stage of a amplifier, in a DTV transmitter
The intermodulation level varies depending on the transmitter configuration.
Out of band intermodulation has to be reduced to be compliant in Europe with ETSI EN 302 296 V1.1.1 (2005-01).

Illustrated below are the European compliance requirements.

There is a 10dB relaxation in non critical areas.
Determining what is a non critical broadcast area is usually done by the relevant authorities or there agents.

On low power repeaters above 25W tx power used for gap filling compliance can be a particular problem if simpler repeater methods are used without pre correction. The transmitter/transposer filter mask required for 25W tx power or below to comply with EN 302 296 V1.1.1 (2005-01). is relaxed.

ETSI EN 302 296 V1.1.1 (2005-01)
Out-of-band emissions emissions at
fo ± 12 MHz 8 MHz channels,
Deduct 3dB if measuring ref to peak.

 Specifications subject to change

Taylor Bros. (Oldham) Limited.Tel: 0161 652 3221,Fax: 0161 626 1736 www.taylorbros.co.uk
**4W UHF AMPLIFIER ANALOGUE OR DTV FOR TRANSMITTERS/TRANPOisers**

**TS3585U**

UHF Class A
4W pk sync
1W COFDM DTV
peak average power *
(ip shoulders at -35dB, reduce output power for non critical and critical mask compliance or use correct mask filter )

- Gain 35dB±1dB
- Impedance 50Ω
- Power requirment 12V 4.5A
- $995.00

*Power levels for DTV are calculated differently compared to analogue. Greater coverage is achievable with much lower power. 1W amplifier used with 10dB of overall TX antenna gain provides 10W ERP. This will provide a DTV signal level of 45dBuV at 5 miles at 800MHz, unimpeded by terrain with a 11dB RX antenna and allowing 4dB for feeder loss. The coverage can be further with multiplexes using 16QAM modulation. Using a lower frequency decreases the path loss. Path loss at 5 miles is 109dB at 800MHz and 104dB at 470MHz

Modern DTV receivers will work on signal levels very much lower than 45dBuV, a minimum signal level sometimes used in planning coverage for DTV. Quality reception can result with levels of 35dBuV.

We will provide a free computer coverage map for purchasers of transponder systems of 1W and above.

We require lat/long coordinates and antenna height.

Overtemperature protection, shuts down the amplifier and restarts when ambient temperature is reduced. The amplifier can be operated at up to 50deg C ambient, although 30deg C or below is a recommended operating temperature..
Illustrated is a low cost six channel UHF TV transposer.

A one watt analogue transposer broadcasting in group A will have a range of up to 2 miles, if the receive antenna is a 10 element and if the transmitter antenna has an overall gain of 12dB (inc. feeder loss). The range is extended up to 20 miles providing there is no physical obstruction if a low noise mast head amplifier with over 20dB of gain is fitted to the receive antenna.

A 250mW DTV transposer broadcasting in group A will have a range of up to 13 miles. Reducing the output power level by 6dB will reduce the range by 50% to 6.5 miles and also improve the IP shoulders by 12dB.

Compliance in the UK with the Ofcom regulations is a condition of licensing for all transposers and transmitters. Permitted levels of IP (intermodulation) shoulders will be detailed in the Ofcom license issued. See brief technical info that is on the same page as the TS1879 amplifiers. Similar licensing conditions are applicable in other countries.

The system is modular to enable simple maintenance.

The convertors are frequency agile with 40dB of AGC. IF SAW filters are used to remove unwanted adjacent digital channels.

The oscillators in the convertors are PLL referenced to a crystal with a 5kHz accuracy and ageing typically 5kHz per year.
Low Power Digital UHF/VHF DVB-T COFDM transmitters, transposers, remultiplexers.

A band stop or band pass filter may be required to block the output tx power from overdriving the input when used as a transposer. These are available and can be seen elsewhere in the catalogue. Standard versions are 75 ohms, 50 ohm versions are available.

Digital de modulator, remodulator and remultiplexer. Employs reed solomon error correction.

Low power for small areas and gap fillers

64 QAM can be remultiplexed into 16QAM for difficult terrain.

(16QAM reduces bandwidth so extra transposers are required to remultiplex 64QAM to 16QAM)

ERP 100W
With 11dB gain antenna system including feeder loss.

Configured into Six, DVB-T Receivers/Remultiplexers Low power TX, s.

Power output meters are standard on transmitters 1kW and above. Optional power meters are available on low power transmitters. Legislation in some countries requires power monitoring.

<table>
<thead>
<tr>
<th>Type</th>
<th>Power Out</th>
<th>19&quot; Rack</th>
<th>Price</th>
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<tbody>
<tr>
<td>S400MPX-DVB T-1</td>
<td>1W</td>
<td>1x 3U</td>
<td>$4,000.00</td>
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<td>S400MPX-DVB T-10</td>
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<td>1x 3U</td>
<td>$6,860.00</td>
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</tbody>
</table>

Input options up to 2 per TX
- Terrestrial DVB-T: $277.20
- QPSK satellite receiver MPEG 2: $154.00
- QPSK satellite receiver MPEG 4: $476.00
- Composite video/audio in MPEG 2 encoder: $518.00
- SDI digital video/audio in MPEG 2 encoder: $598.00
- QAM Cable receiver 49-802MHz: $226.80

RF inputs available 75 or 50 ohm, please specify.