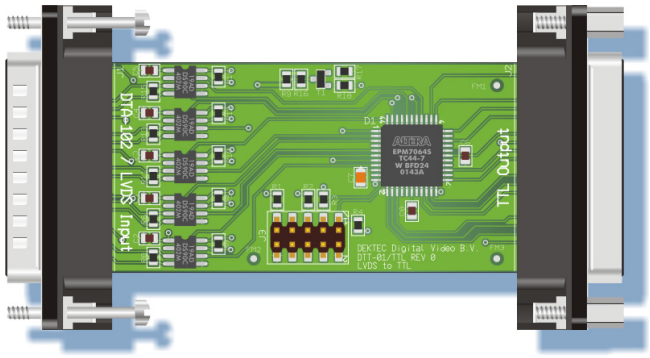
TTL Target Adapter for DTA-102

- LVDS to 5V TTL Conversion
- User-Customisable Altera Contents
- No Power Supply Required

FEATURES

- Converts the LVDS output signals of the *DTA-102 DVB/SPI Output Adapter* to a TTL-level parallel transport stream
- Can be attached directly to the DTA-102
- No separate power-supply required: 5V power for the DTT-01/TTL is supplied by the DTA-102 through the DVB/SPI cable
- Decodes **CODE** signal from the DTA-102 back to **PSYNC** (packet sync) and **DVALID** (data valid)
- Contains an EPM7064S in-circuit programmable ALTERA device that is user-customisable for implementing special functions, e.g. a transport-stream selector
- Data and control is led through ALTERA and can be adapted.
- Special cable DTE-MF25-2m5 available for remote application of the DTT-01/TTL



APPLICATIONS

- Direct insertion of an MPEG-2 transport stream into a set-top box
- Supply MPEG-2 data or raw 8-bit synchronous data to experimental circuitry

KEY ATTRIBUTES

Parameter	Value
Target Adapter ID	1*
Input Connector	Male 25-p sub-D
Output Connector	Fem. 25-p sub-D
Number of Functional Pins on Output Connector	21
High-Level TTL Output Voltage	> 2.4 V
Low-Level TTL Output Voltage	< 0.45 V

* Target Adapter ID is recognised by DTA-102

RELATED PRODUCTS

Type	Description
DTA-102	DVB/SPI Output Adapter for PCI Bus
DTE-MF25-2m5	DVB/SPI cable with male and female 25-pin sub-D connector for connecting target adapters to the DTA-102

Table of Contents

1. General Description

1.1. Overview

The DTT-01/TTL is a ***target adapter*** that converts the LVDS output signals of the *DTA-102 DVB/SPI Output Adapter* to standard **TTL-level** output signals.

Please refer to the DTA-102 documentation for general information about target adapters.

The *Target Adapter ID* of the DTT-01/TTL is 1. When the DTT-01/TTL is connected to the DTA-102, DEKTEC play-out software (**DtPlay** or **DTC-300**) will show this Target Adapter ID.

Target adapters do not need a separate power supply (§1.4).

The operation of the DTT-01/TTL can be customised by reprogramming "the ALTERA". Refer to §2 for instructions.

1.2. Input Connector

The input connector of the DTT-01/TTL is a ***male*** 25-pin sub-D connector that receives the parallel synchronous (8-bit + clock) LVDS signals from the DTA-102. The connector lay-out is the same as that of the DTA-102 in Target-Adapter mode.

The DTT-01/TTL can be directly connected to the DTA-102 without cable. The module can be tightened with the two connector screws.

The DTT-01/TTL can also be connected to the DTA-102 with a special cable. A standard DVB/SPI cable cannot be used, because one male and one female connector must be fitted. DEKTEC offers such a cable under type number DTE-MF25-2m5.

1.3. Output Connector

The TTL signals are available on the output connector of the DTT-01/TTL, which is a ***female*** 25-pin sub-D connector.

When the EMP7064S is loaded with the factory-default ALTERA code, the pin assignments for the output connector are shown in Figure 1.

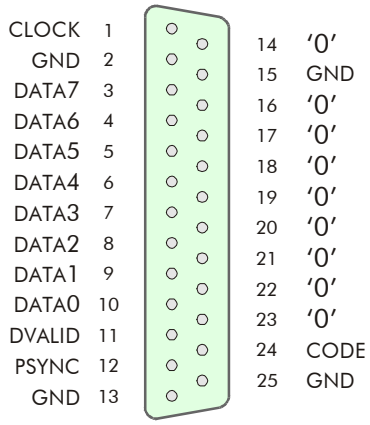


Figure 1. Standard pin assignment of the 25-pin sub-D output connector.

The **CLOCK** signal is the TTL version of the transport-stream byte clock. The positive edges of this clock are located halfway between the data transitions of the other signals.

DATA7 through **DATA0** form the transport data bytes, with **DATA7** being the MSB.

PSYNC is the packet-synchronisation signal, which is '1' during the first byte of a transport packet. **DVALID** is the data-valid signal.

The usefulness of the **CODE** signal depends on the transmit mode of the DTA-102:

- If the DTA-102 is in **Raw** mode, **CODE** acts as a data-valid signal;
- If the DTA-102 is <u>not</u> in **Raw** mode, **CODE** is a copy of the encoded **PSYNC**/**DVALID** signal, which in general is useless.

Note

- If the DTA-102 is in **Raw** mode, the **PSYNC** and **DVALID** outputs of the DTT-01/TTL are not functional and should be ignored.

It all boils down to this simple scheme:

Table 1. Impact of DTA-102 Transmit Mode

Transmit Mode	PSYNC, DVALID	CODE
Raw	Do not use	Data Valid
Not **Raw**	OK	Do not use

Back to Figure 1: The signals labelled '0' are ALTERA outputs programmed to a fixed 'low' level. These connector pins should be left unconnected. Do not connect to ground!

1.4. Power Supply

Target adapters do not require a separate power adapter: the 5V power for the DTT-01/TTL is supplied by the DTA-102 through the DVB/SPI cable. Refer to the DTA-102 documentation for more information on how this works.

1.5. Operation with the DTA-102

When connected to the DTA-102, the DTT-01/TTL will only function correctly if power is applied to the DVB/SPI connector.

Note

- If power is not switched on, the DTT-01/TTL will short-circuit the DTA-102 outputs. This is harmless in itself, but it does cause the indicator LED on the DTA-102 to flash red.

Power can be switched on by:

- Using the **–p** option of the DtPlay command-line streamer program;
- Writing a small program that calls the `TsOutpChannel::SetPower` function in the DTAPI.

1.6. References

- *DTA-102: DVB/SPI Output Adapter for PCI Bus, DEKTEC Digital Video B.V., 2002* – Specification of the DTA-102, the PCI card to which the DTT-01/TTL must be connected.
- *DTAPI: C++ API for DTA-series of Digital-Video PCI-Bus Cards, DEKTEC Digital Video B.V., 2001* – Specification of **DTAPI**: the C++ interface to access the DTA-102 functions at a higher level of abstraction than would be possible using direct device-driver calls.

2. Customisation (Advanced)

2.1. Programming the ALTERA

The controller IC on-board of the DTT-01/TTL is an EMP7064S EPLD (Erasable Programmable Logic Device), manufactured by ALTERA. When the DTT-01/TTL leaves the factory, this ALTERA device is programmed with a default program (refer to §1.3 for the functionality of the default EPLD contents.)

Technically savvy users may customise the processing of the DTT-01/TTL by creating their own ALTERA code and reprogramming the EPM7064S in-circuit using a programming cable.

The EPM7064S contains 64 macro-cells, which should be sufficient for implementing e.g. custom synchronisation signals or a 2:1 transport-stream multiplexer that switches between the DTA-102 stream and an external TTL-level stream.

2.2. Required Materials

The following software and materials are required to reprogram the ALTERA EPLD on the DTT-01/TTL:

- An EPLD compiler capable of generating code for the EMP7064S. A good choice is the free *MAX+PLUS® II BASELINE* software, downloadable from www.altera.com.
- The *ByteBlasterMV* Parallel Port Download Cable. This cable interfaces on one side with a standard PC parallel port and on the other side to the 10-pin header on the DTT-01/TTL.
  The *MAX+PLUS® II BASELINE* software can be used as programming software.

2.3. ALTERA Code Design

The contents of the factory-default ALTERA code for the DTT-01/TTL can be downloaded from www.dektec.com. This code can be used as the starting point for a custom design.

The standard code is written in AHDL (refer to ALTERA documentation for specifications) and consists of the following files:

Dtt01Ctrl.acf

The "assignment and configuration" file, which contains device options and I/O-pin definitions. Changes to this file are only required if a certain signal on the TTL connector should become bi-directional or input.

Dtt01Ctrl.tdf

File containing the main program. The main

place to insert your customisations.

CodeDecoder.tdf, CodeDecoder.inc

Standard sub-design to decode the **CODE** signal from the DTA-102. The data lines are delayed by pipeline registers.
Typically, this design can be left unchanged, unless the number of registers must be squeezed to a minimum.

2.4. Programming

To program the DTT-01/TTL the first action is to remove the cover. Please use two properly sized screw drivers in the two notches at one side of the case; carefully lever to disengage the top cover.

The *ByteBlasterMV* cable can now be connected to the 2x5 pin header. Pin 1 of this header is located on the "TTL side" of the PCB. On the *ByteBlasterMV* cable, the wire connected to pin 1 is identified by having an alternate colour.

Programming of the ALTERA device requires that power is applied to the DTT-01/TTL. This can be achieved by connecting the DTT-01/TTL to a DTA-102 and running the free DEKTEC utility ***DtPlay*** with the ***–p*** option.

When all actions above have been completed, the ALTERA can be reprogrammed, e.g. using the ***MAX+PLUS® II BASELINE*** software. Please refer to the ALTERA documentation for further programming instructions.

2.5. More Information

DEKTEC is happy to support you if you need more information about customisation of the DTT-01/TTL. Please direct any questions you may have to info@dektec.com.