TC1705

RS-530 SYNC/ASYNC
FIBER OPTIC MODEM
(with Optional Dual Optics)

User's Manual

MODEL: ____________________

S/N: ____________________

DATE: ____________________

Notice!

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Chapter 1 - Overview

Description

The TC1705 is an economical and dependable fiber optic modem with a CCITT RS-530 interface. It is available in either rack mount or stand alone versions; the rack mount version can be converted to the stand alone version with the addition of a sheet metal box. The TC1705 can communicate at distances up to 4 km using Multimode optics and up to 30 km using Single Mode optics. A two-way "one fiber" single mode version is available. TC1705's design utilizes advanced FPGA (Field Programmable Gate Array) technology to increase reliability and flexibility.

Electrical Specifications & Virtual Connection

Interface: **RS-530**
Data Rates: **Asynchronous DC (0Hz) to 500 Kbps**
Synchronous DC (0Hz) to 256 Kbps
Connector: **DB25 Female DCE (or DTE configurable)**
Pinouts:

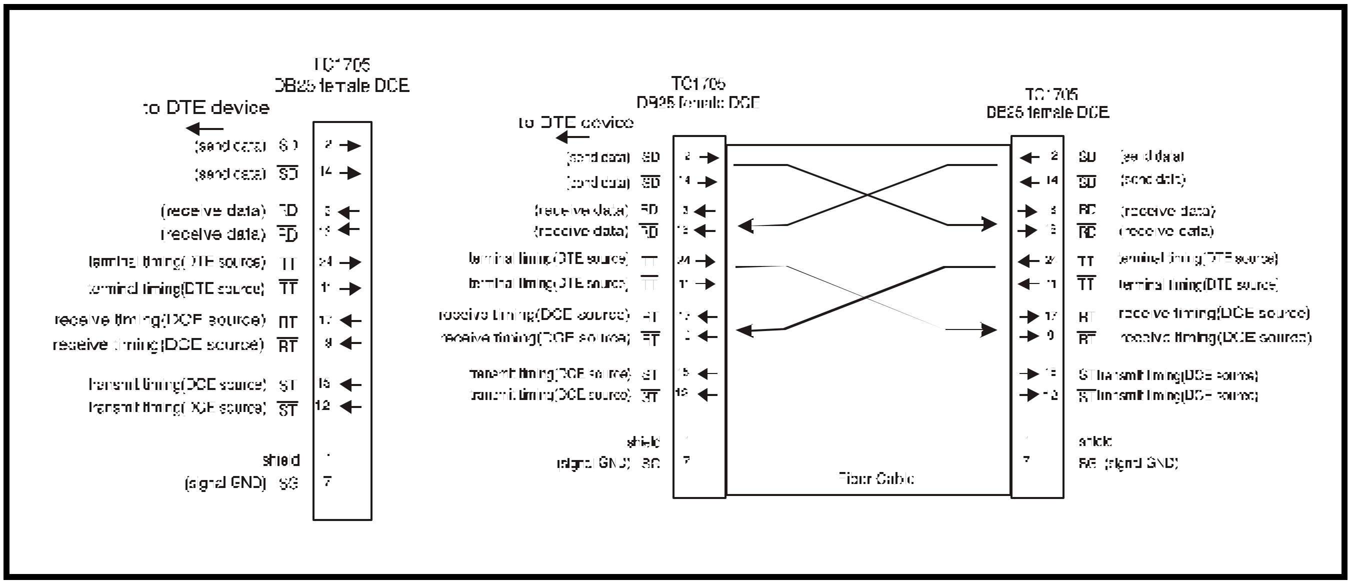


Figure 1. TC1705's DCE Pin Assignments & Virtual Connections

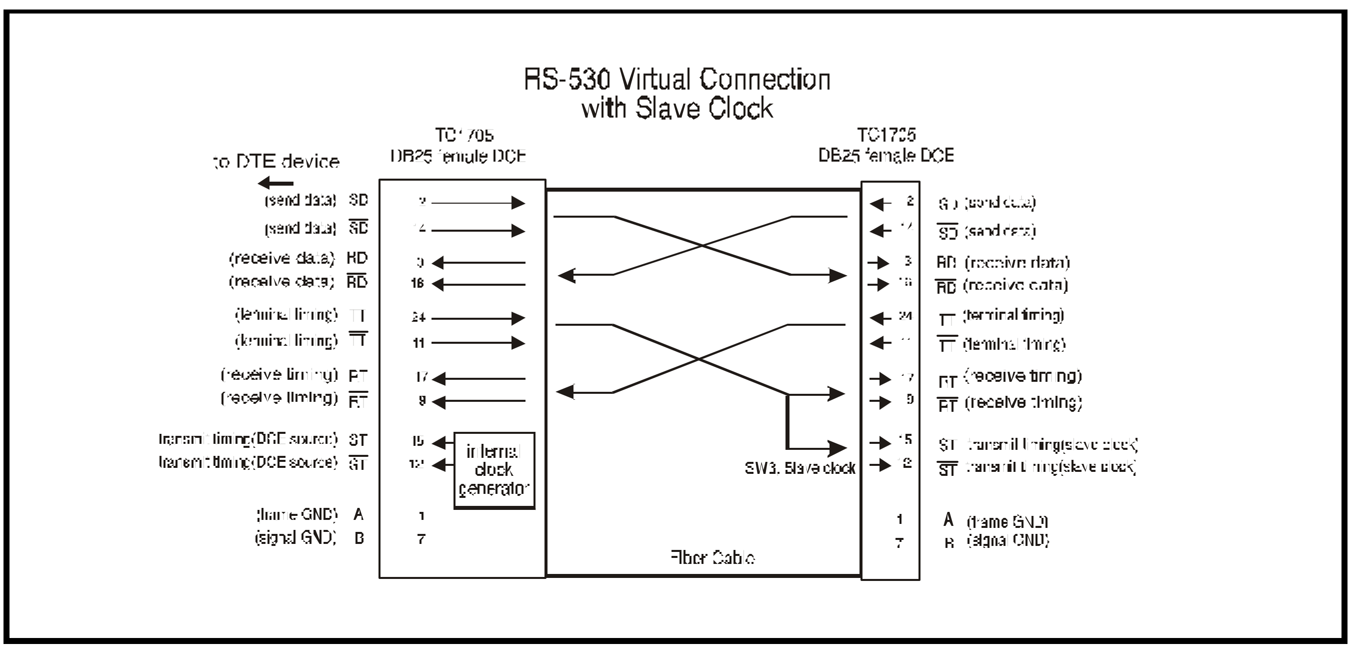


Figure 2. TC1705's DCE to DCE Virtual Connections with Slave Clock Enabled

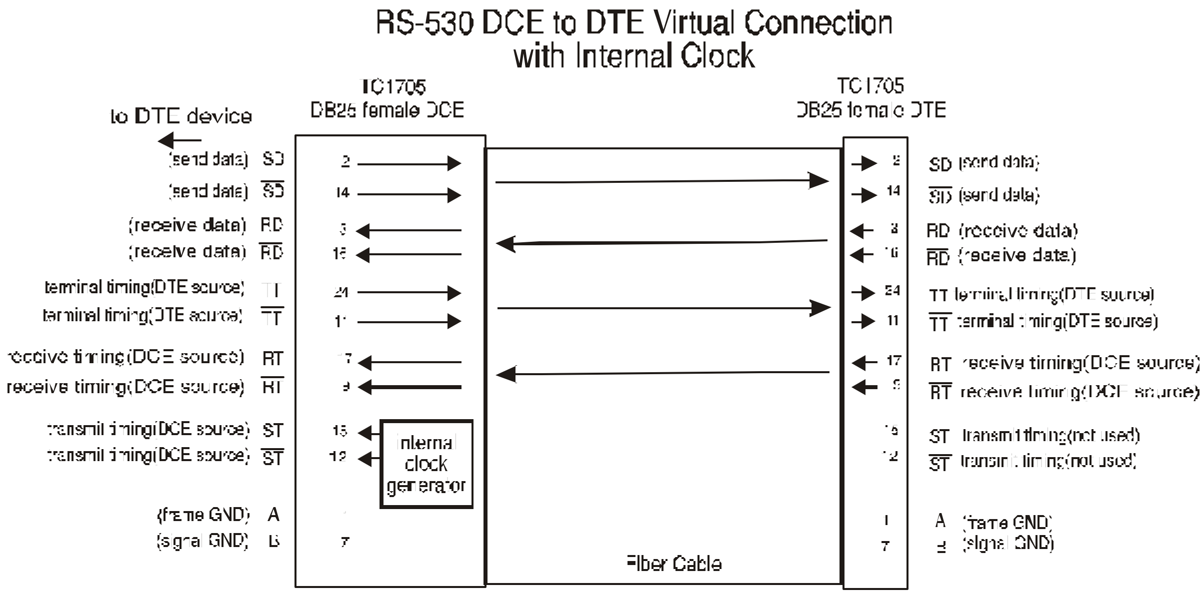


Figure 3. TC1705's DCE to DTE Virtual Connections with Internal Clock Enabled

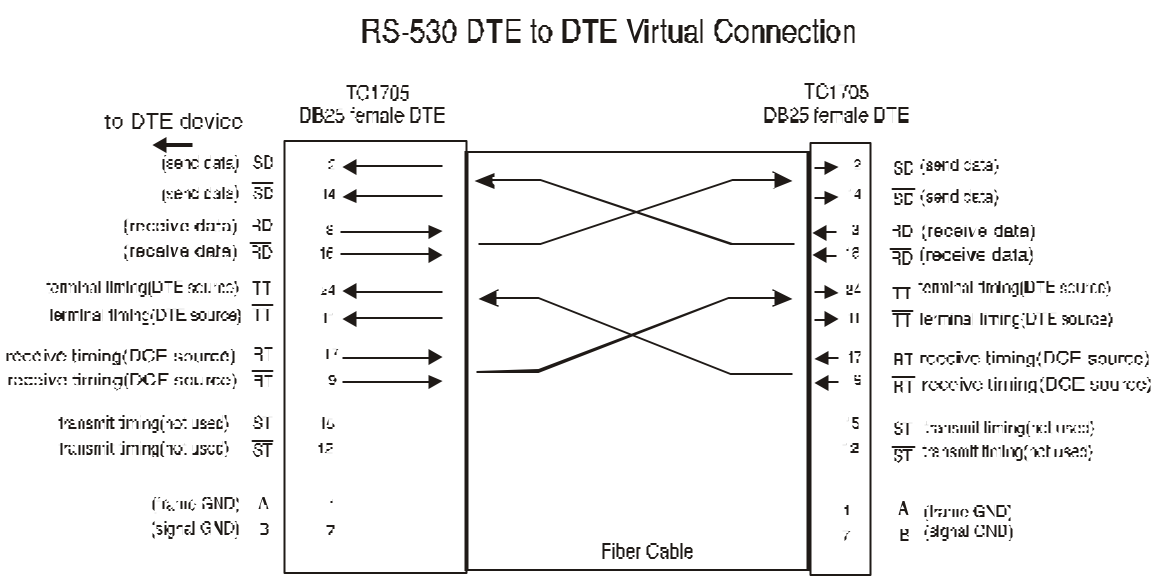


Figure 4. TC1705's DTE to DTE RS-530 Virtual Connections

Note: When the TC1705 is configured as a DTE device, there is no internal clock provided on pins 15 & 12.

Optical Specifications

Multimode Model

Transmitter:	**LED; typical Launch Power:**	**-17.0 dBm* (1310nm, @62.5/125µm)**
Receiver:	**PIN Diode; typical Sensitivity:** **Optic saturation level:**	**-33.0 dBm* (1310nm, @62.5/125µm)** **-11.0 dBm*(1310nm, @62.5/125µm**
Loss Budget:	**1310nm Multimode @62.5/125µm:**	**15 dB**
Distance:	**1310nm Multimode, @62.5/125µm:**	**up to 4km distance***
Wavelength:	**1310nm Multimode:**	
Connector:	**SC** **ST**	

Single Mode 1310nm, 20km Model

Transmitter:	**FP Laser; typical Launch Power:**	**-14 to -7 dBm* (1310nm, @9/125µm)**
Receiver:	**PIN Diode; typical Sensitivity:** **Optic saturation level:**	**-34.0 dBm* (1310nm, @9/125µm)** **-3 dBm*(1310nm, @9/125µm)**
Loss Budget:	**1310nm Single Mode, @9/125µm:**	**20 dB**
Distance:	**1310nm Single Mode, @9/125µm:**	**up to 20 km distance**
Wavelength:	**1310nm Single Mode(LASER):**	
Connector:	**ST** **FC** **SC**	

Single Mode 1310nm, 75km Model

Transmitter:	**FP Laser; typical Launch Power:**	**-3 to 0dBm* (1310nm, @9/125µm)**
Receiver:	**PIN Diode; typical Sensitivity:** **Optic saturation level:**	**-36.0 dBm* (1310nm, @9/125µm)** **-3 dBm* (1310nm, @9/125µm)**
Loss Budget:	**1310nm Single Mode, @9/125µm:**	**33dB**
Distance:	**1310nm Single Mode, @9/125µm:**	**up to 75km distance**
Wavelength:	**1310nm Single Mode (LASER)**	
Connector:	**ST** **FC** **SC**	

Single Mode 1550nm, 75km Model

Transmitter:	**DFB Laser; typical Launch Power:**	**-10 to -1dBm* (1550nm, @9/125µm)**
Receiver:	**PIN Diode; typical Sensitivity:** **Optic saturation level:**	**-34.0 dBm* (1550nm, @9/125µm)** **0 dBm* (1550nm, @9/125µm)**
Loss Budget:	**1550nm Single Mode, @9/125µm:**	**24dB**
Distance:	**1550nm Single Mode, @9/125µm:**	**up to 75km distance**
Wavelength:	**1550nm Single Mode (LASER)**	
Connector:	**ST** **FC** **SC**	

Launch power, sensitivity and distance are listed for reference only. Contact factory for higher loss budget requirements

Single Fiber, 50km Model

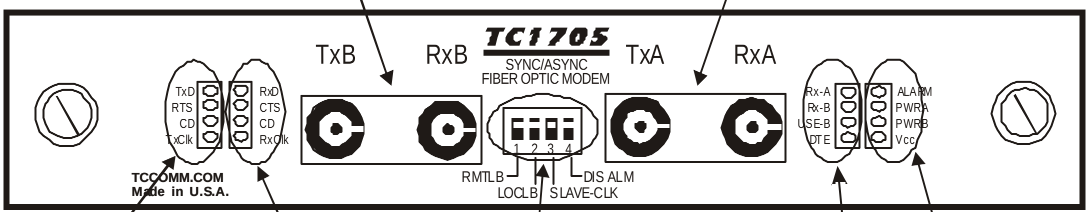
Transmitter:	**Typical Launch Power:**	**-8 to -3 dBm* (1310nm/1550nm, @9/125µm)**
Receiver:	**PIN Diode; typical Sensitivity:** **Optic saturation level:**	**-33.0 dBm* (1310nm/1550nm, @9/125µm)** **-3 dBm***
Loss Budget:	**1310nm/1550nm Single Mode, @9/125µm:**	**29 dB**
Distance:	**1310nm/1550nm Single Mode, @9/125µm:**	**up to 50km distance**
Wavelength:	**1310nm/1550nm Single Mode:**	
Connector:	**SC Only**	

Launch power, sensitivity and distance are listed for reference only. Contact factory for higher loss budget requirements.

LEDs, DIP Switches and Connectors

Connector for optional secondary optic link (7)

Connector for primary optic link (6)



4
status for received electrical signals
(from remote unit):
RxD(RD)- "received data"
CTS- "clear to send" (RS-232 Only)
CD- "data set ready" (RS-232 Only)
RCLK- "received clock"

5
Status for electrical signal from
local user's device:
TxD- "transmit data"
RTS- "request to send" (RS-232 Only)
CD- "data terminal ready" (RS-232 Only)
TxClk- "transmit clock"

3
Switches to initiate ("down" position)
following tests and function:
RMTLB- turn on remote unit's loopback
LOCLB- turn on local electrical interface's loopback
SLAVE-CLK - Turns on Slave Clock mode: (RT=ST)
DISALM- disable alarm buzzer and relay

2
received optic signal status
& DTE indicator
RxA:
solid- optic received "OK" from primary side ("A" side)
flash- optic signal lost
RxB:
solid- optic received "OK" from secondary side ("B" side)
flash- optic signal lost or "B" side is not enabled
USE-B:
solid- secondary optic signal is being used due to
primary optic signal lost
off- secondary optic receiver is not enabled or primary
optic signal is being used.
DTE:
the electrical signal interface at the rear panel
(DB25 female connector) is a "DTE" interface

1
Alarm Indicator, Power Status &
Operating Voltage Status
Alarm (red):
off - normal operation
solid- major alarm condition (optic input lost)
flash- remote loopback activated by remote unit
PWR A: DC power supply from PWR A jack
PWR B: DC power supply from PWR B jack
Vcc: +5 VDC operating voltage power supply

NOTE:
SLAVE-CLK Switch 3: - DTE it is not used.
- DCE when it is "on" (down position), it turns "on" the Slave-clock mode: (RT=ST).
when it is "off" (up position), it turns "on" the Internal clock mode: (ST=Internal clock) see table 1.

Function of Sw3

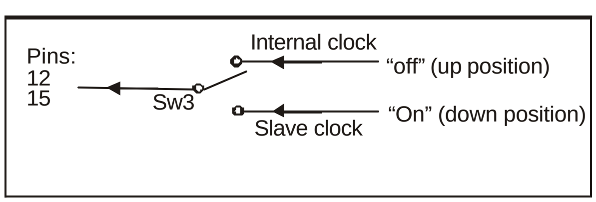


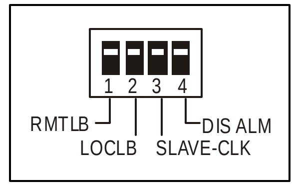
Figure 5. TC1705's Front Panel

DIP Switch Functions

For trouble-shooting purpose, user can conduct remote loopback and local loopback test. TC1705 also has a built-in signal generator for user to validate fiber optic link. There are two groups of DIP switches: one at the front panel, the other one is located at the center of the PC board.

Front Panel Switches

There are four DIP switches located at the front panel. Usually, they are very useful during installation or trouble-shooting. They are described as follows:



DIP #1: Remote loop back. This switch (DIP #1) initiates the Remote loop back function. The composite optic signal is received from optic "RxA" and decoded, then looped back to optic "TxA."

DIP #2: Local loop back (for diagnostic use). When DIP #2 is pressed down, an electrical signal loop is created, the input RS-530 signal is converted to the TTL level and looped back to "RD" (pins 3 & 16 and 'RT" (pins 9 & 17).

DIP #3: In the "Up" position, the unit is in the internal clock mode. When in the "Down" position, the unit is in Slave Clock Mode. The internal or Slave clock signal is transmitted to the user's equipment through pin 12 and pin 15 (see figure 5, and page 7) when the unit is configured as a DCE device.

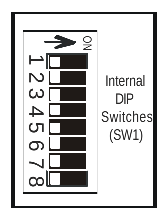
DIP #4: Disable dry contact alarm.

These functions can be initiated from one of four DIP switches accessable from front panel. Under normal operation, all the switches should be set in "UP" position.

SW1 Internal PCB Switches

There are other eight DIP switches located at the PC board and can not be accessed from front panel. These switches usually only used during installation.

SW1-1: Enable signal generators. This switch initiates the built-in Signal Generator function. The unit will generatea visual signal to verify optic link.



SW1-2: Configure TC1705's interface as a DCE (off)or DTE (on).

SW1-3: Enable secondary optic receiver.

SW1-4: Enable async mode.

For Oscillator: 8.192Mhz

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
SW1-5:		x		x		x		x		x		x		x		x
SW1-6:			x	x			x	x			x	x			x	x
SW1-7:					x	x	x	x					x	x	x	x
SW1-8:									x	x	x	x	x	x	x	x
		8k	9.6k	16k	19.2k	32k	38.4k	56k	64k	128k	256k	N/A	N/A	N/A	N/A	N/A

Legend: X = ON

This table shows the Internal Clock speed when the TC1705 is DCE, on DB25 pin 15 & 12. When DTE, there's no Internal Clock.

Table 1.

SW1 Internal PCB Switches

For Oscillator: 6.176Mhz

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
SW1-5:		x		x		x		x		x		x		x		x
SW1-6:			x	x			x	x			x	x			x	x
SW1-7:					x	x	x	x					x	x	x	x
SW1-8:									x	x	x	x	x	x	x	x
		6.031k	9.6k	12k	19.2k	24.1k	38.4k	N/A	48k	96k	192k	385k	N/A	N/A	N/A	N/A

Table 2.

RS530 Signal Cross Referece

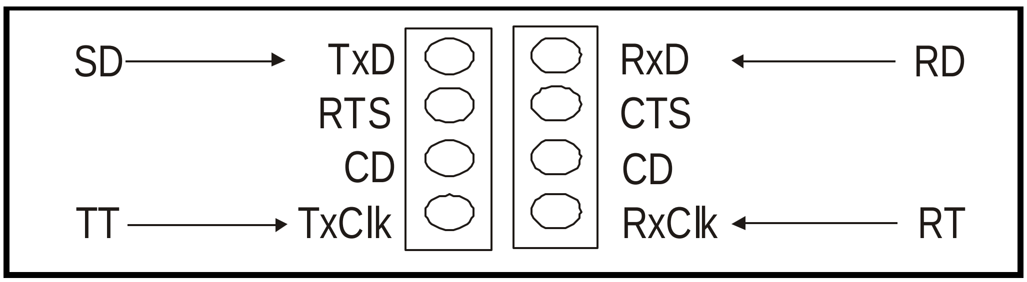


Figure 6. TC1705's Signal Cross Reference

Two-way "Single Fiber Strand" (optional)

As an option, the TC1705 supports two-way "Single Fiber Strand" communication to distances up to 50km over single mode fiber.

It is ideal for situations where existing fiber optic cable capacity is limited. Because it doubles existing cable capacity by transmitting bi-directional signals over a single fiber, it eliminates the need to install additional fiber optic cable.

The TC1705 "Single Fiber Strand" uses a Fiber Optic Wavelength Division Multiplexer (WDM) which enables 1310nm and 1550nm wavelengths to be transmitted simultaneously on the same fiber optic cable. The direction of the optical signals can be in the same direction or opposite directions.

Transparent to incoming data, the "Single Fiber Strand" WDM option, effectively doubles existing cable capacity by multiplexing two separate channels over one single mode fiber.

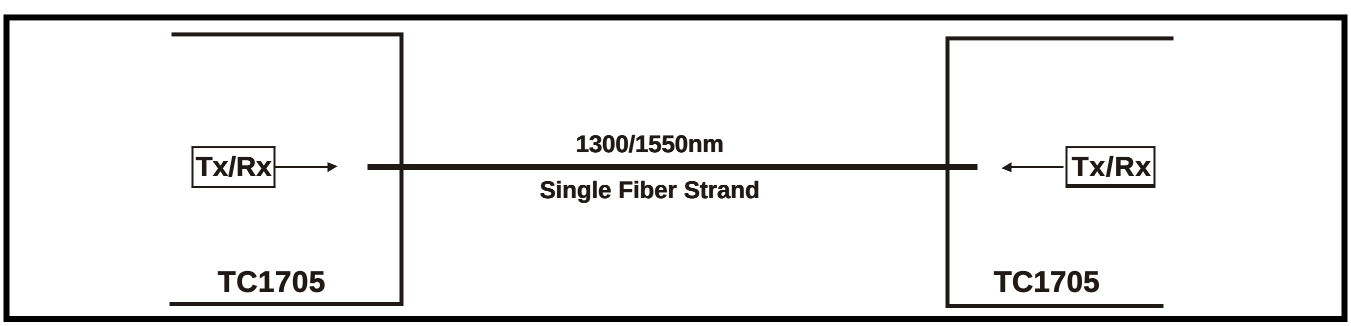
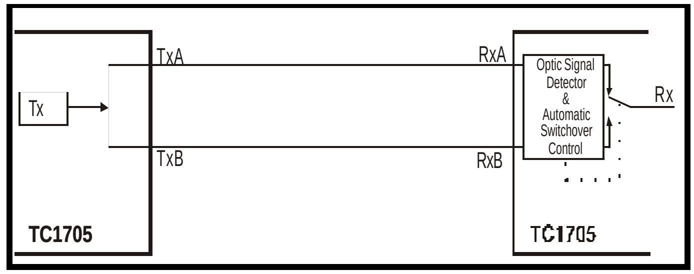


Figure 7. TC1705 (with "Single Fiber Strand" Option) Logic Diagram

Optical Redundancy (optional)

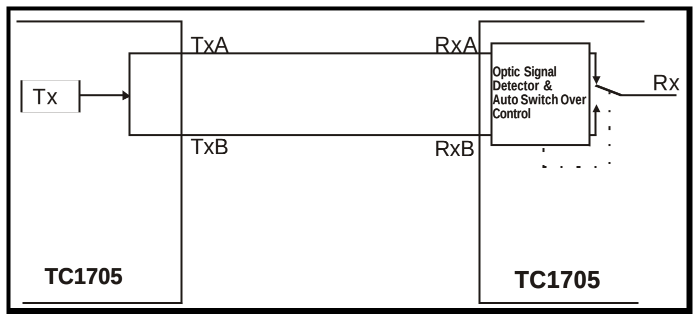
If optic redundancy was ordered with the unit, figure below applies to its operation. Optic redundancy is used to prevent the loss of data transmission in the event an optic cable, transmitter, or receiver is broken or degraded. Should this occur, the secondary optic link & receiver "B" is enabled automatically, thereby preserving the integrity of the communication. In the meantime, the "Alarm" LED will flash and the buzzer will sound to indicate a cable breakage.

When the unit is equipped with optic redundancy, the optic transmitter "TxA" and "TxB" both transmit the same signal to the remote unit. It is up to the remote unit to decide whether "RxA" or "RxB" should be used as the valid incoming optic signal. By default, "RxA" is the primary receiver; "RxB" is the stand by backup.



Dry Contact Relay Alarm Switch

A terminal block connector at the rear panel provides for the Dry Contact Alarm Switch. Normally in the OPEN position, any alarm condition will force the switch to a CLOSED position. This relay can be used in conjunction with an external device to signal an alarm condition.



Power Supply

The TC1705 consumes very low power. The input voltage is from 12V to 14V DC and current is 500mA (max). You may use an external power adapter with the following specifications: 12V DC @800mA (positive polarity at the left terminal when viewed from the rear panel).

The power plug can be connected into either power jack on the rear panel. Because the TC1705 is equipped with a built-in power redundancy feature, the "POWER A" or "POWER B" LEDs on the front panel will illuminate according to which power source the unit is drawing from. If power redundancy is utilized, both LEDs will light.

For units with the -48V DC power supply option, a DC-to-DC converter is installed inside the unit. The DC current requirement for the optional -48V DC power supply is @50mA.

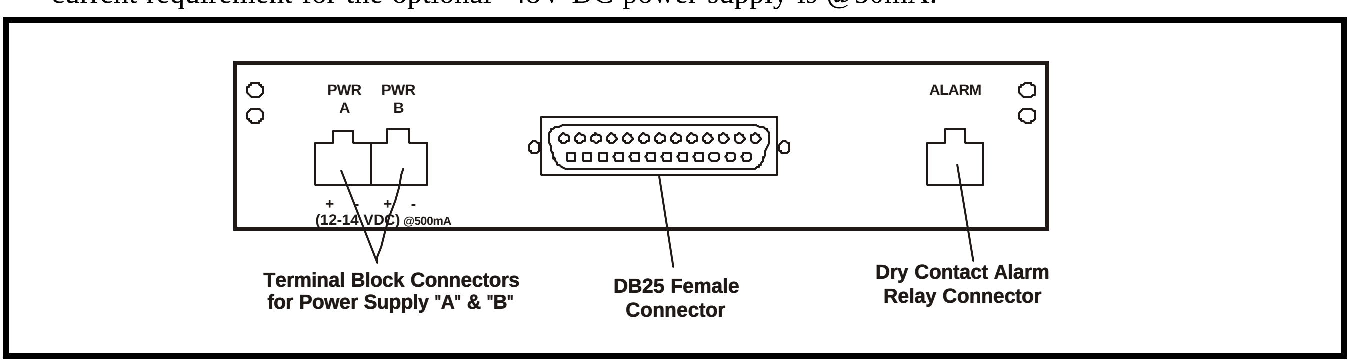


Figure 8. TC1705 RS-530's Rear Panel

Chapter 2 - Installation

Unpacking the Unit

Before unpacking any equipment, inspect all shipping containers for evidence of external damage caused during transportation. The equipment should also be inspected for damage after it is removed from the container(s). Claims concerning shipping damage should be made directly to the pertinent shipping agencies. Any discrepancies should be reported immediately to the Customer Service Department at TC Communications, Inc.

Equipment Location

The TC1705 should be located in an area that provides adequate light, work space, and ventilation. Avoid locating it next to any equipment that may produce electrical interference or strong magnetic fields, such as elevator shafts, heavy duty power supplies, etc. As with any electronic equipment, keep the unit from excessive moisture, heat, vibration, metallic particles and freezing temperatures.

Installation Procedure Summary

The TC1705 is designed for quick and easy installation. Before installing, however, make sure all DIP switches are in the up (Off) position and double-check the polarity at the DC power's terminal block connector. The installation procedure is as follows:

1. **Connect your DTE/DCE Device to the DB25 Connector:** Check the Pin Assignments on page 20 and verify your application's data rate. Shielded cable is recommended.
2. **Connect the optic cables:** Connect the local unit's optic "TxA" to the remote unit's optic "RxA". Connect the local unit's optic "RxA" to the remote unit's optic "TxA." (do the same for "TxB" and "RxB" on Dual Optics Models).
3. **Connect the power plug:** The plug can be connected into either power terminal "A" or "B" (check for proper polarity). The unit is equipped with power redundancy. By plugging a second power supply to the spare power terminal, power redundancy is enabled. Verify that the power "A" and/or "B" LED is illuminated.
4. **Turn "On" your DTE/DCE device:** For "Async" units, "TxD" LED should be illuminated, but "TxCLK" LEDs should be off. For "Sync" units, check the signal status LEDs on the front panel of the TC1705. The "TxD" & "TxCLK" LEDs should be illuminated or flashing.
5. **Check the remote unit's "RxD" & "RxCLK" LEDs:** For "Async" units, "RxD" LED should be illuminated when there is data signal being received, but "RxCLK" LED should be off. For "Sync" units, the "RxD" & "RxCLK" LEDs should be illuminated or flashing only when there is data or clock signals being sent or received. The "RxCLK" LED may not be very bright (due to the short clock strobe).
6. **Check the "Rx-A" LEDs:** When a good optic signal is received, the "Rx-A" LED on the corresponding unit should illuminate. (Check "Rx-B" LED when "Optic TxB" and "Optic RxB" are in use. Dual Optics model only).

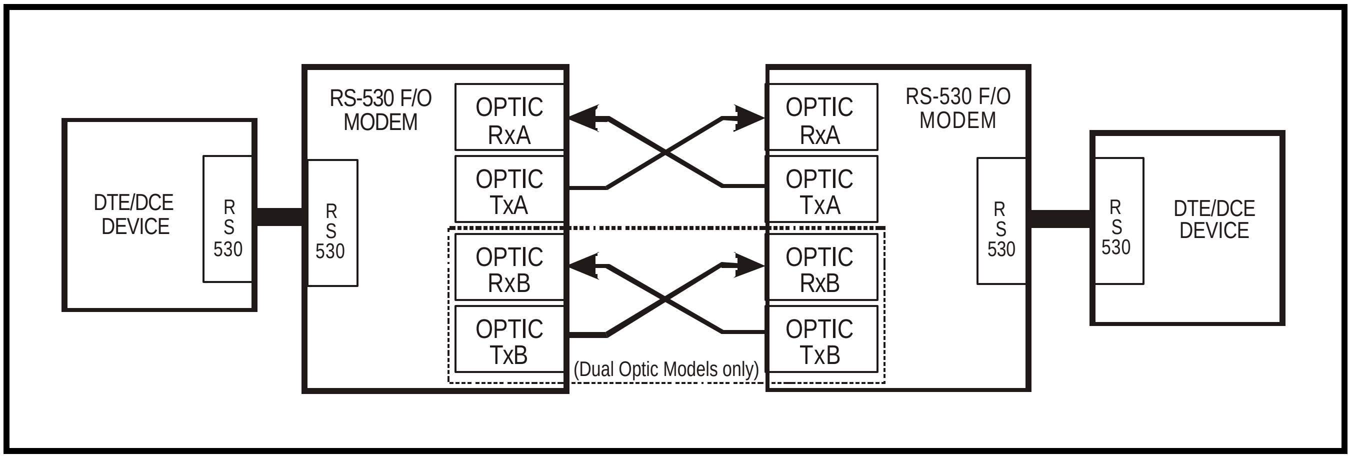


Figure 9. Typical Point-to-Point RS-530 Application

After installation is complete, it is an excellent idea to verify and record the optical cable loss. This reading will both verify the integrity of the system and provide a benchmark for future troubleshooting efforts (see Chapter 3 - Troubleshooting).

Optic Cable Verification

If the "Rx-A" LED on the front panel is flashing (or off), this is an indication that the optic signal is not being correctly received. Usually, unsecured fiber optic connectors or faulty cable are to blame. A good connection is indicated by the "Rx-A" LED on the front panel being solidly lit. This indicates that the receiving cable is correctly connected to the remote unit's optic "TxA."

On Dual Optics Models, the same applies to "RxB" and "TxB." Dual Optics Models will automatically switch to optic "RxB" if optic "RxA" is not receiving a valid signal. This automatic switchover enables the user to verify the "B" fiber connection by simply disconnectiong the "A" fiber connection, thereby verifying the optical redundancy capability of the unit. (Dual Optics is an optional feature).

Chapter 3 - Troubleshooting

General

Typically, most problems encountered during installation are related to an improperly wired RS-530 cable or a break in the integrity of the fiber optic link (cable or connectors).

All LEDs are "Off"

If no LEDs are lit on the unit, check the DC power supply, terminal block connector plug, and/or power source. If the problem persists, contact the Technical Support Department at TC Communications, Inc.

Alarm LED

When there is an alarm condition, the red "ALARM" LED will be lit and the "RxA" LED will also flash to indicate the optic signal has been lost. The Alarm will also trigger the dry contact relay switch.

Optic Cable Types

Conventionally, fiber optic cable with yellow-colored insulation is used for single mode applications; gray or orange-colored insulated cable is for multimode use. If multimode cable is used in a single mode application, the test results could be erroneous and confusing.

Calculating the Loss on the Fiber

The fiber optic link and/or the connectors are frequently the source of communication problems. If problems are present, check the optic connectors and the integrity of the link first. Ideally, the link should be calibrated for total loss after the installation has been completed. This will accomplish two things: (1) it will verify that the total loss of the link is within the loss budget of the device and (2) it will provide a benchmark for future testing. For example, a system that has been tested as having 6dB of signal loss when installed should not suddenly test out as having a loss of 10dB. If this were the case, however, the fiber link or connector would probably be the source of the problem.

These are the reference values we use to calculate the loss on the fiber:

Multimode 850nm	**:**	**3 dB loss per km on 62.5/125µm cable***
Multimode 1310nm	**:**	**2 dB loss per km on 62.5/125µm cable***
Single Mode 1310nm	**:**	**0.5 dB loss per km on 9/125µm cable***
Single Mode 1550nm	**:**	**0.25 dB loss per km on 9/125µm cable***

These numbers are listed for reference only. We recommend an OTDR reading be used to measure actual link loss.

RS-530 Cable Verification

1. Make sure the electrical signal connections match the pin assignments for the device (refer to pages 3 & 4 and Appendix A for DCE/DTE user equipment pin connections). Verify signal connections by checking the status LEDs on the front panel of the TC1705. Verify that the pin signal connections match the appropriate LED responses (see Figure 7).

2. Conduct a Local Loopback Test (DIP switch #2 set to the down (on) position) to help isolate a RS-530 interface problem. This will loopback the electrical signal to the DTE/DCE device for verification.

3. Be sure that all switches are set correctly. (All the front panel DIP switches should be in up (off) position. All the "SW1 Internal DIP Switches" should be in up (off) position. If the TC1705 is an "Async" unit, SW1-4(switch 4 of the "Internal DIP Switches") should be in down (on) position.

Chapter 4 - Bench Tests

General

It is highly recommended to conduct a bench test before actual installation. A bench test will allow the user to get familiar with all the functions and features of the TC1705 in a controlled environment. Knowledge of the TC1705's functions and features will facilitate installation and troubleshooting efforts later on.

Test Equipment Requirements

End user equipment required for testing:

1. One BERT (Bit Error Rate Tester) test set with a DB25 male adapter and appropriate interface module (match pin assignments with the diagrams on pages 3 & 4).
2. Two short optical cable jumpers with appropriate connectors (ST or FC).
3. Four small copper-wire jumpers.

Pre-Installation Tests

1. Make sure the appropriate power supply accompanies the TC1705 unit (see page 10).
2. To verify that the unit functions properly, plug in only the power connector to the terminal (be sure to observe correct polarity), without having any other cable connections to the unit.
3. On the front panel, the appropriate green "Power A" or "Power B" LED should be illuminated (depending on whether you plug into the "A" or "B" terminal on the back of the unit). Both lights should be on if you utilize power redundancy (power is connected to both "A" and "B" terminals on the rear panel).
4. The "ALARM" and "Rx-A" LEDs should be flashing.
5. The "Vcc" LED should be illuminated. Please note: all other LEDs can be in a random state (flashing, solidly lit, or off) as only upon proper receipt and transmission of a signal will the TC1705 set its LEDs appropriately for normal operation. Proceed to the Local Optical Loopback Test.

Local Optic Loopback Test

1. Set up the bench test as illustrated in Figure 10 on the following page.
2. Make sure your BERT tester is turned on and configured as a DTE device if the unit is DCE.
3. Connect the DB25 male adapter (check pin assignments on pages 3 & 4) from the BERT tester to the TC1705’s DB25 female connector (on the rear panel).
4. Make sure you have the appropriate optical jumper cable with the correct connectors (see page 8). Connect one end of a short optical jumper to the optic "TxA" of the unit being tested and the other end to the optic "RxA" on the same unit to complete the optical loopback.
5. Set the BERT test set to the same (or as close to the same) data rate as the application you plan to connect to (typically 19.2Kbps through 256Kbps Synchronous).
6. The data bits should be selected as ‘8 bits’ and the data pattern should be set to ‘2047’ on the BERT tester.
7. At this point, the tester should indicate a Synchronous signal being received (if the optical cable and connectors are good and the cable has been connected properly).
8. For "Async" units(SW1-4: enable "on"), check that the "Rx-A," "TxD," and "RxD," LEDs are illuminated. For "Sync" units(SW1-4: disable "off"), check that the "Rx-A," "TxD," "RxD," "TxCLK," and ""RxCLK" LEDs are illuminated. If any other LEDs illuminate or flash, make sure all DIP switches on the TC1705 are in the correct position and reset the BERT tester. You should not see any bit errors. To verify this, inject an error using the BERT tester to see if it will be recorded by the tester, then verify that no additional errors appear after the user injected error. Proceed to the Remote Optic Loopback Test.

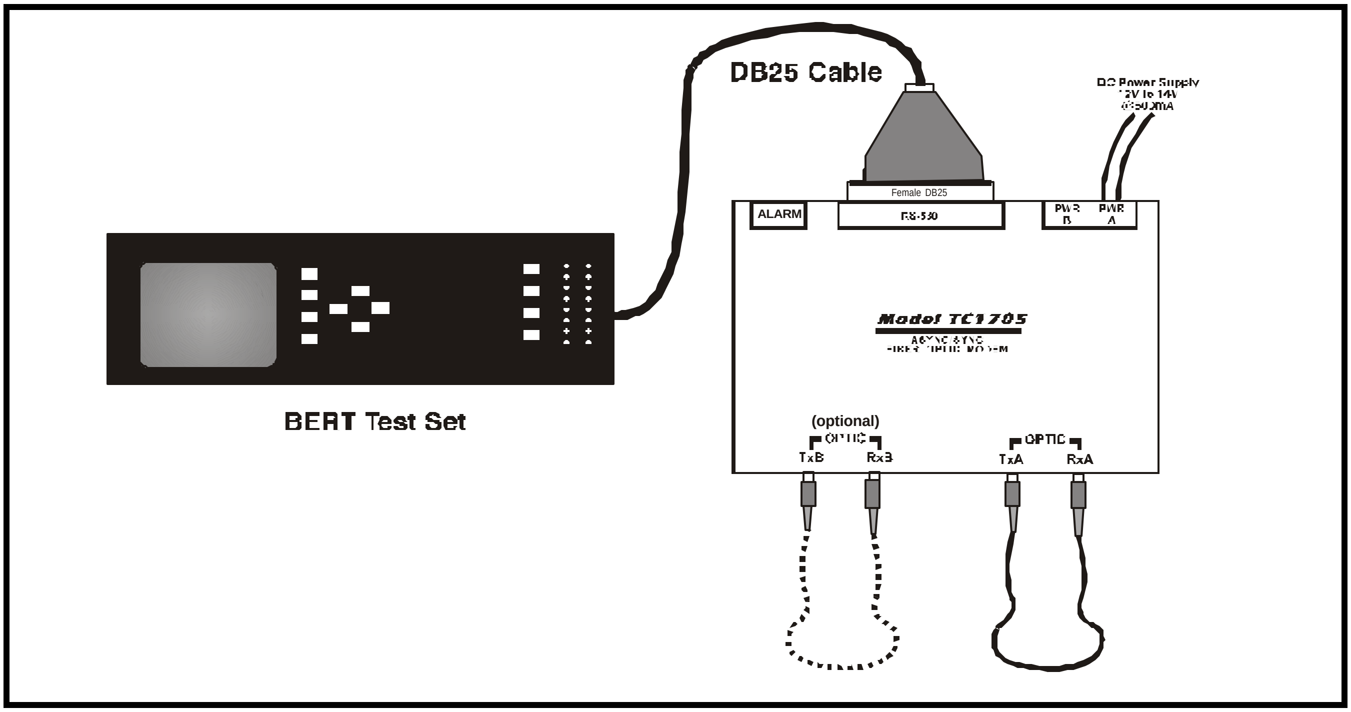


Figure 10. Local Optic Loopback Test Connection Diagram

Remote Optic Loopback Test

1. Connect a second TC1705 unit. As with the first unit, follow the bench test steps on the previous page. When you have completed the Local Optic Loopback Test for the second unit, proceed to the next step.
2. Set up the bench test as illustrated in Figure 11 on the following page.
3. Connect four copper-wire jumpers to short (loopback) the DB25 Female connector on the rear of the remote unit as follows (these copper-wire connections will loopback the signal at the remote TC1705):

Pin 2 (SD) to Pin 3 (RD)
Pin 14 (SD) to Pin 16 (RD)
Pin 24 (TT) to Pin 17 (RT)
Pin 11 (TT) to Pin 9 (RT)

4. Set the BERT test set to the same (or as close to the same) data rate as the application you plan to connect to (typically 19.2Kbps through 256Kbps Synchronous).
5. The data bits should be selected as ‘8 bits’ and the data pattern should be set to ‘2047’ on the BERT tester.
6. At this point, the tester should indicate a Synchronous signal being received (if the optical cable and connectors are good and the cable has been connected properly).
7. For "Async" units(SW1-4: enable "on"), check that the "Rx-A," "TxD," and "RxD"LEDs are illuminated. For "Sync" units(SW1-4: disable "off "), check that the "Rx-A," "TxD," "RxD," "TxCLK," and ""RxCLK" LEDs are illuminated. If any other LEDs illuminate or flash, make sure all DIP Switches on the TC1705 are in the correct position and reset the BERT tester. You should not see any bit errors. To verify this, inject an error using the BERT tester to see if it will be recorded by the tester, then verify that no additional errors appear after the user injected error.

8. At this point, both units tested will have passed all electrical and optical tests and will have been verified that they are functioning properly. Proceed to the next TC1705 unit to be tested or begin verifying other equipment and cabling in your application if you have not already done so.

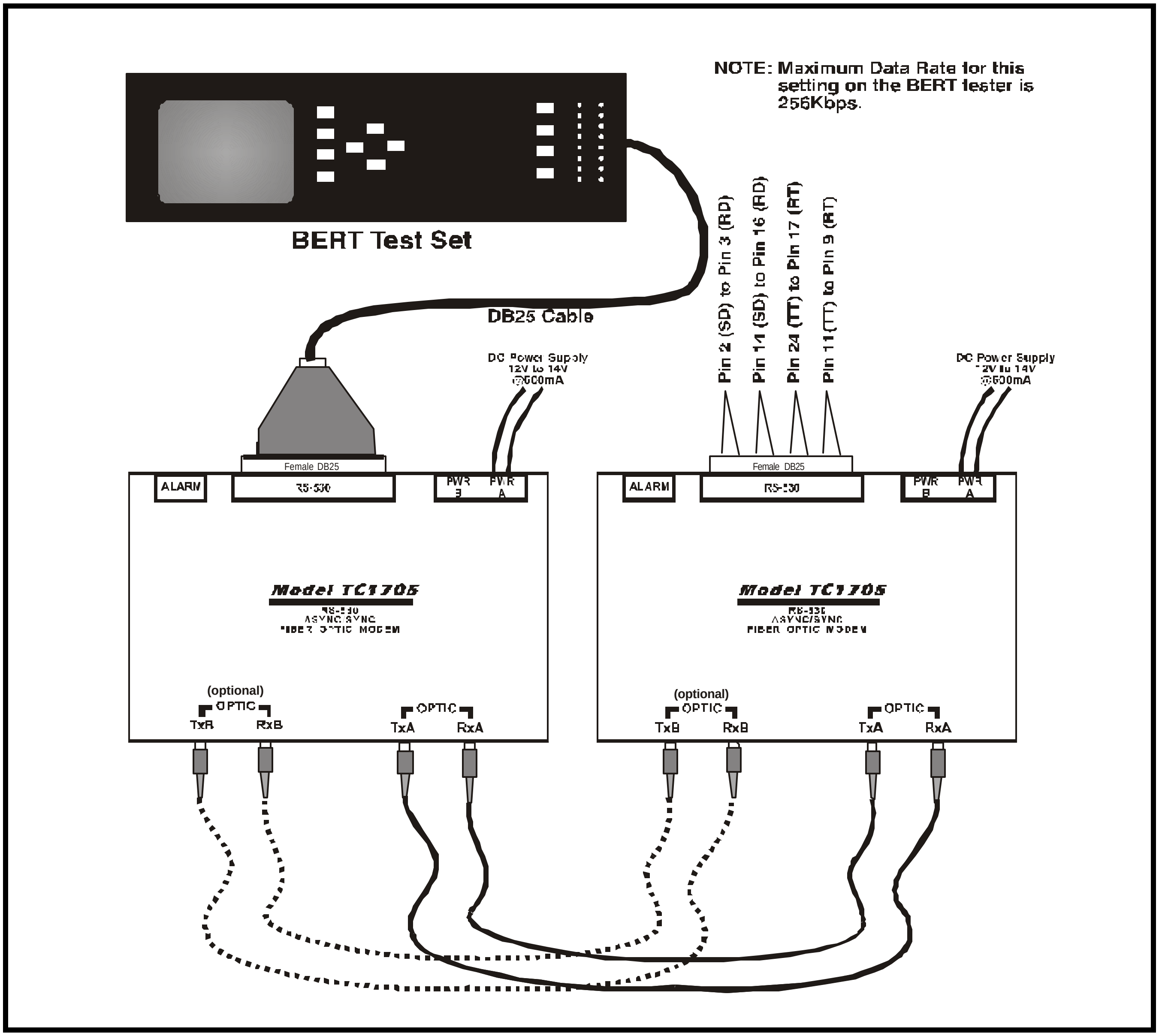


Figure 11. Remote Optic Loopback Test Connection Diagram

Bench Test With Built-In Signal Generator

The TC1705 has built-in signal generator to simulate a polling device's incoming electrical signal. The built -in signal generator is a pulse signal indicated by blinking LED. The flash rate intentionally reduced for easy visual confirmation.

1. Setup the bench test as shown in figure 12.

2. At the local TC1705 unit, turn on the "SIG-GEN" by sliding SW1-1 (switch 1 of the "SW1 Internal DIP Switches") to the up (on) postion.

2a. For "Async" units(SW1-4: enable "on"): Turn on the "RMTLB" by pressing down the DIP switches #1 of "Front Panel DIP Switches" on the Local TC1705. The "TxD," "RTS," and "CD," LEDs on the local TC1705 should start blinking. Verify that the remote unit's "RxD," "CTS," and "CD," LEDs also blink, indicating receipt of the remote unit's simulated response.

2b. For "Sync" units(SW1-4: disable "off"): Turn on the "RMTLB" by pressing down the DIP switches #1 of "Front Panel DIP Switches" on the Local TC1705. The "TxD," and "TxCLK," LEDs on the local TC1705 should start blinking. Verify that the remote unit's "RxD," and "RxCLK" LEDs also blink, indicating receipt of the remote unit's simulated response.

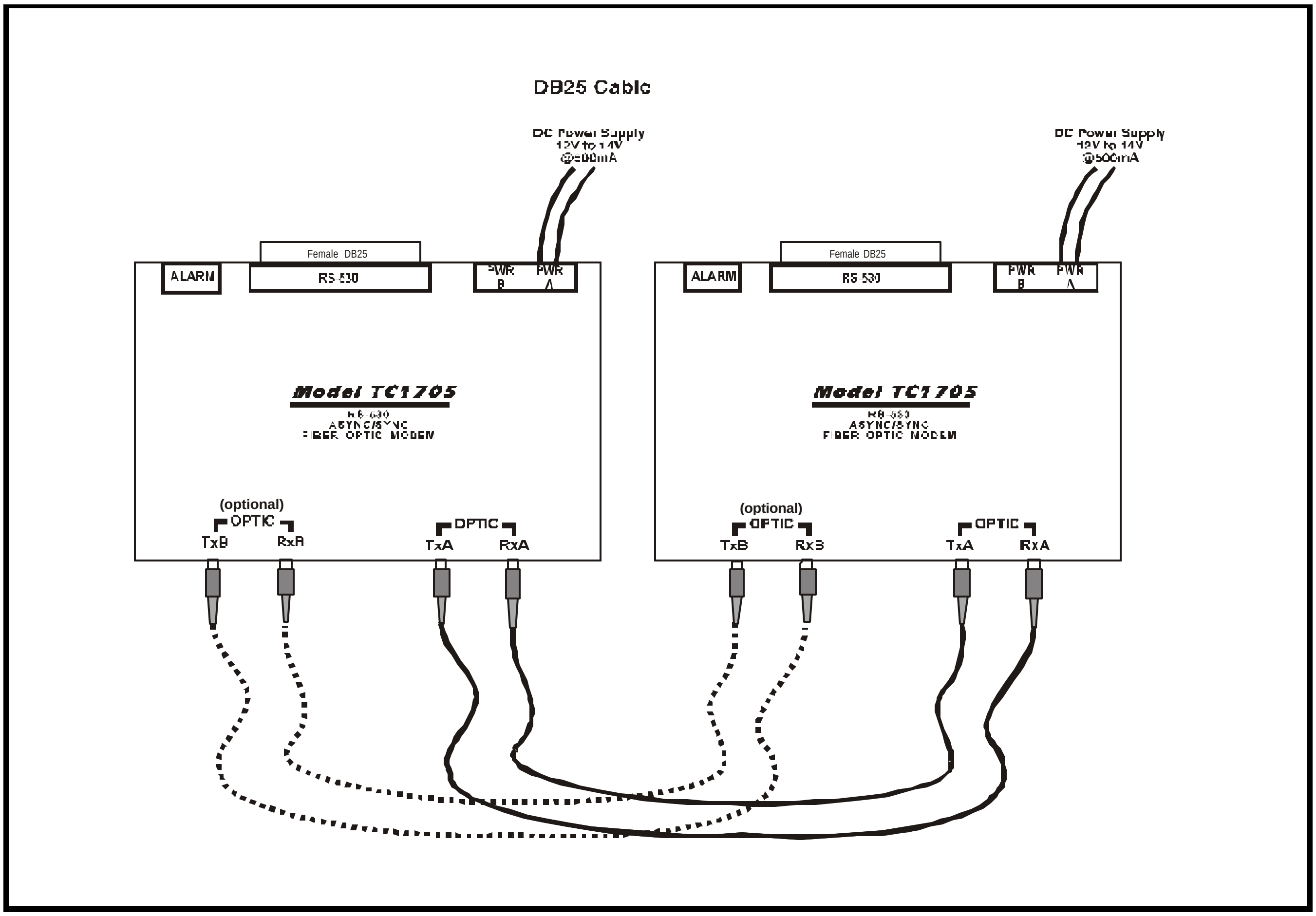
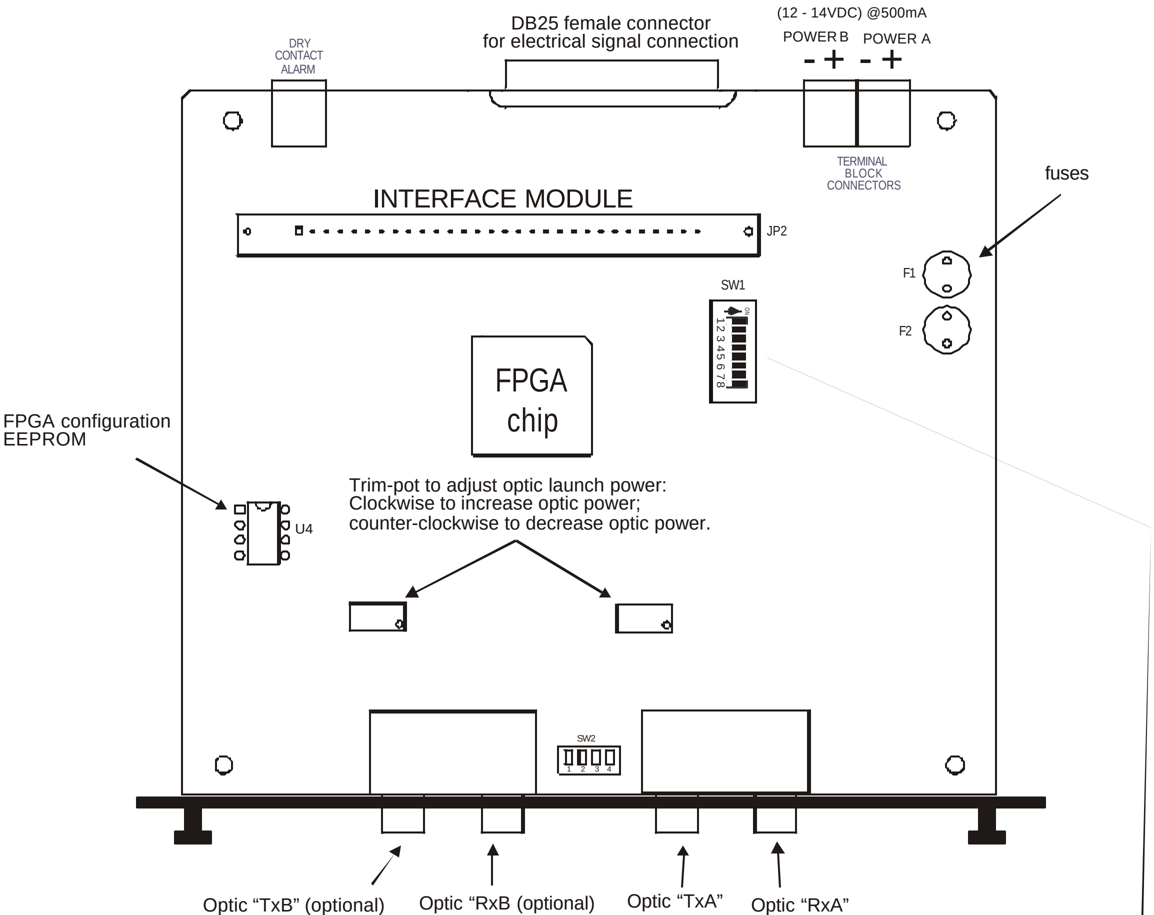


Figure 12. Signal Generator Bench Test Connection Diagram

Other Testing Considerations

1. If front panel DIP switch #3 (slave clock) is pressed down, the received clock signal from the remote unit is used as an internal clock signal and is transmitted to the user’s equipment through pins 12 and 15.

Chapter 5 - Component Placement



SW1 Internal DIP Switches

Used to configure TC1705 as a DCE (left) or DTE (right) device, enable secondary optic receiver, enable signal generator & select internal clock rate.

SW1-1: enable signal generators
SW1-2: configure TC1705's interface to DTE (see text for details)
SW1-3: enable secondary optic receiver
SW1-4: enable "async" mode

Legend: X = ON

This table shows the Internal Clock speed when the TC1705 is DCE, on DB25 pin 12 & 15. When DTE, there's no Internal Clock.

For Oscillator: 8.192Mhz

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
SW1-5:		X		X		X		X		X		X		X		X
SW1-6:			X	X			X	X			X	X			X	X
SW1-7:					X	X	X	X					X	X	X	X
SW1-8:									X	X	X	X	X	X	X	X
		8k Hz	9.6k Hz	16k Hz	19.2k Hz	32k Hz	38.4k Hz	56k Hz	64k Hz	128k Hz	256k Hz	N/A	N/A	N/A	N/A	N/A

Figure 13. Component Locations on TC1705's Internal PCB (with optional Dual Optics)

Chapter 6 - Specifications

Data Rates

Asynchronous DC (0Hz) .... DC to 500 Kbps
Synchronous DC (0Hz) .... DC to 256 Kbps

Optical

Transmitter .... LED/ELED/LASER
Receiver .... Pin Diode
Wavelength .... 850nm/1310nm Multimode
.... 1310/1550nm Single Mode
Connector .... ST* (optional FC)
Loss Budget** .... 15dB Multimode 850nm/1310nm @62.5/125µm
.... 20dB Single Mode 1310/1550nm @9/125µm

Electrical

Interface RS-530
Connector .... DB25 Female

System

Bit Error Rate .... 1 in 10^9 or better

Indicators

System status .... ALARM, PWR A, PWR B, Vcc, RX-A, Rx-B, USE-B, DTE
Electrical Signal Status .... RxD, TxD, CTS, RTS, CD, CD, TxCLK, RxCLK
Optic Signal Status .... TxA, RxA (for dual optics TxB, RxB)

Power Source

Standard .... 12V to 14VDC @500mA (typical)
Optional .... 24VDC, 48VDC, or 115/230VAC with an external power cube

Temperature

Operating .... -10°C to 50°C
Hi-Temp Version (optional) .... -20°C to 70°C
Storage .... -40°C to 90°C
Humidity .... 95% non-condensing

Physical (Rackmount Card)

Height .... (17.7 cm) 7.0"
Width .... (3.2 cm) 1.25"
Depth .... (14.8 cm) 5.75"
Weight .... (192 gm) 5.44 oz

ST is a trademark of AT&T
****Contact factory for loss budget requirements greater than 20dB (Laser version).***

Appendix A

Interconnecting EIA-530 with EIA-449(Straight through)

DB25 male to DB37 male/female Adapter Cable
(convert TC1705's RS-530 DB25 DCE/DTE to RS-449 DB37 DTE/DCE)

		signal direction into TC1705 if it is DCE ←	signal direction out of TC1705 if it is DTE →	RS-530 DB25 male pin #	RS-449 DCE DB37 male pin#
Send Data	A	←	→	2	4
	B			14	22
Receive Data	A	→	←	3	6
	B			16	24
Terminal Timing (DTE source)	A	←	→	24	17
	B			11	35
Receive Timing	A	→	←	17	8
	B			9	26
Transmit Timing (DCE source) (INT clock or Slave clock)	A	→	NOT APPLICABLE	15	5
	B			12	23
signal ground				7	19
frame ground				1	1

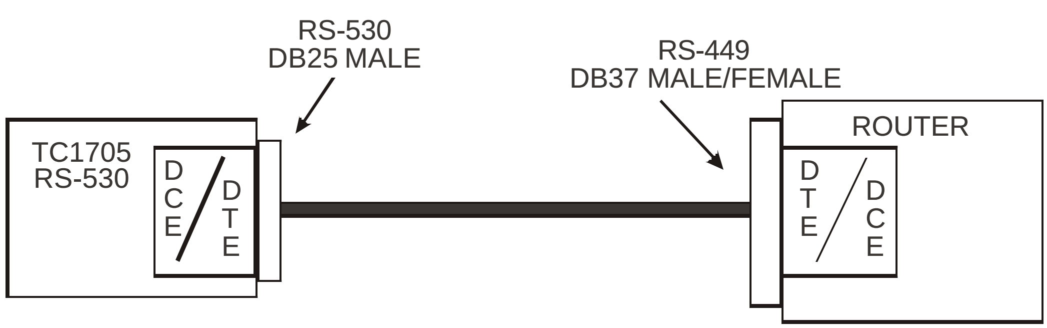


Figure 14. RS-530 (DB25) to RS-449 (DB37) Pin Assignments