

T-PAD SPECIFICATION



Physical Properties:

Dimensions: 105mm (L) x 95mm (B) x 26mm (H)
Casing: Red ABS plastic casing.

LCD interface to display unit status and call activity for each channel.

Serial Connections: 4 x full V.24 (RJ45) interfaces
USB Connector: USB-B Port
Antenna connection: SMA Bulkhead Jack
Power Connection: 6 way Molex Jack

Power:

Power Supply: 12V DC nominal
6V DC min
13.6V DC max
Power Consumption: Minimum at Idle: 20mA @ 7.5V (150mW)
Maximum at Transmit: 1.25A @ 12V = 2.63W

Environmental Properties:

Operating Temperature: 0°C to +55°C
Storage Temperature: -10°C to +85°C

General Properties:

Dual EDGE setup and server addresses with automatic fallback.
128 Bit encryption on data channel.
Full time monitoring of unit health.
Multi-protocol support on all four serial interfaces, allowing different protocols to work concurrently on the serial interfaces.
Serial interfaces are full duplex.
USB-B Port for PPP connections
In field upgrading of unit firmware via EDGE.
Unit configuration update via SMS and EDGE.

1. T-PAD PORT SPECIFICATIONS

The T-Pad has four ports, each being a RJ45 Female connector with the following pin configurations

Description	Pin
DCD	1
RD	2
TD	3
DTR	4
SG	5
DSR	6
RTS	7
CTS	8

2. T-PAD SERVICE SIGNALS

T-PAD service signals are character strings sent to the DTE on the receive data line labelled RD (Pin 2). They are generated by the T-PAD in response to various events and error conditions (as defined below). All service signals are followed a **<CR><LF>**. All service signals are output as either 7-bit even parity, or 8-bit no parity depending on the value of parameter 21.

T-PAD Service Signals

T-PAD Command	GPAD Response	Explanation
PAR?<CR>		Displays Port Parameters
SET		Used to set Port Parameters. Refer to paragraph 3.
PARE?<CR>		Displays Engineering Parameters
<DTE Address><CR>		Call setup command. Refer to paragraph 4.
	<DTE Address> COM	Indication of call connected
	CLR DTE mmm	Indication of Clearing, For diagnostic codes, refer to 5
	CLR CONF	Confirmation of Clearing
	* <CR><LF>	T-PAD prompt. Will be given without any error code is command is issued successfully.
	ERR	Indication that the command issued is in error
	INV	Response to SET Command if at least one parameter is invalid

3. CONFIGURING THE T-PAD PORT

3.1. The command used to set any specific parameter is:

SET <par> <value><CR>,

where <par> is the parameter number and <value> is the valid value as per the table below:

Parameter Number	Description	Default value	Valid value	Value/Function
0	T-PAD Application Select	0	0	X.28 PAD mode
1	PAD Recall Character	0	0	None
2 (Not Supported)	Local Echo	0	0 1	Off On
3	Data Forwarding	2	0 2	(on 128th data byte) CR
4	Delay Timer	0	0 1-255	Disabled (must be non-zero in AT mode) Data is automatically forwarded when this timer expires. The parameter is the time in 1/20ths of a second since the last data character was received from the terminal.
5 (Not Supported)	Flow Control from T-PAD (to DTE)	0	0 1	None XON/XOFF
6	Service Signals	5	0 1 5	Disabled Enabled, excluding prompt Enabled, including prompt
7 (Not Supported)	Action on Break	8	8	PAD escapes from data transfer state
11	Data Rate	13	12 13 14 15 16 17 18 19	2 400 bps 4 800 bps 9 600 bps 19 200 bps 28 800 bps 38 400 bps 57 600 bps 115 200 bps
12 (Not Supported)	Flow Control to T-PAD (from DTE)	0	0 1	None XON/XOFF
13 (Not Supported)	Line Feed Insertion	0	0 1	None LF inserted after CR to DTE
15 (Not Supported)	Character Deletion in Data Transfer mode	0	0 1	Disable Enable
21	Parity of service signals and command responses	0	0 2	7-bit even parity 8-bit no parity

4. CALL SET-UP VIA V.24 (RJ45) SERIAL INTERFACE

The section provides an example of an outgoing call (DTE initiated) and an example of an incoming call. The descriptions consider the character strings passed between the DTE and the T-Pad.

4.1. Example of an X.28 Outgoing Call - The following gives an example of an outgoing call:

4.1.1. The DTE asserts RTS or sends <CR>

4.1.2. The T-Pad outputs the T-Pad prompt.

4.1.3. The DTE tries to set up a call using the selection command.:

<DTE Address><CR>

4.1.4. If the call is successful the T-Pad outputs a CALL CONNECTED prompt and goes into the data transfer state.

<DTE Address COM<CR><LF>

No T-Pad service prompt is generated.

4.1.5. If the call is unsuccessful, the T-Pad outputs a CLEAR INDICATION service prompt, reverts to the waiting state, and outputs the service prompt. Refer to paragraph 5

4.1.6. Once a call has been established, data can be transferred over the network in either direction.

4.1.7. The call can be terminated by the DTE turning off RTS for a minimum period of 50 ms. The T-Pad on completion of the clear, reverts to the T-Pad waiting state, and outputs the T-Pad service prompt.

***<CR><LF>**

4.1.8. The call can also be terminated by the host or network sending a clear indication/request. The T-Pad outputs a CLEAR INDICATION service prompt in accordance with 4.1.5 above, reverts to the waiting state, and outputs the service prompt:

4.2. Example of an X.28 Incoming Call

4.2.1. On receiving an incoming call, the T-Pad outputs the incoming call connected signal and enters the data transfer state.

4.2.2. Once a call is established, data transfer can occur in either direction. A clear request sourced from either the DTE or host network can be used to terminate the call. The procedures for these activities are identical to those explained for DTE initiated calls above.

5. CALL SET-UP VIA USB-B INTERFACE

5.1. When using the USB port, the 4 serial interfaces will be disabled.

5.2. Conforms to the standard PPP dialup networking standards.

5.3. The T-Pad USB driver is downloadable from www.connectnet.co.za

6. CLEAR INDICATION CODES

6.1. On terminating a call , the T-Pad will output the following clear indication:

CLR DTE mmm<CR><LF>*<CR><LF>

where mmm is a numeric code indicating the following:

Code	Description
000	Disconnected by the Host
900	No link to server
901	Call timeout
902	Link to server lost
903	Call terminated due to CTS going low. Generated by server:
905	Incorrect DTE address
906	Connection to host failed
909	Link error
911	Unknown DTE address
912	Call timeout
913	Unit upgrade in progress

7. X28 SIGNAL TIMING DIAGRAMS

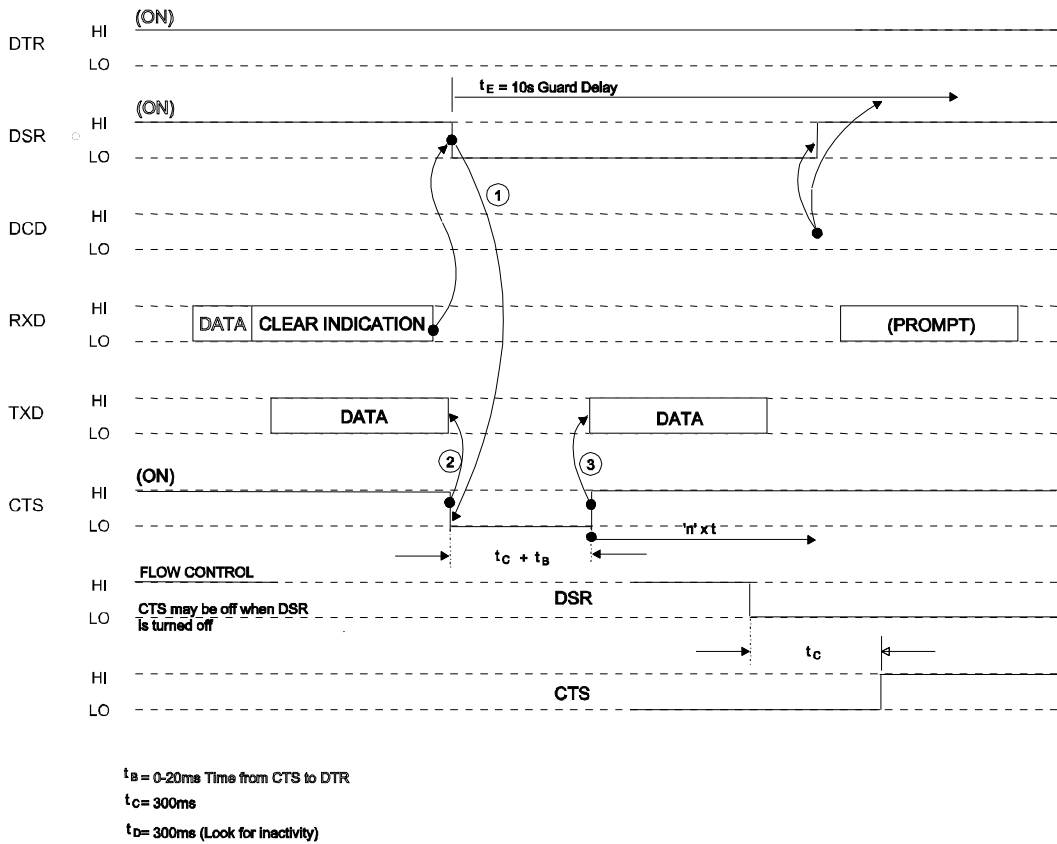


Figure 1 X.28 Clear Back/Loss of Service

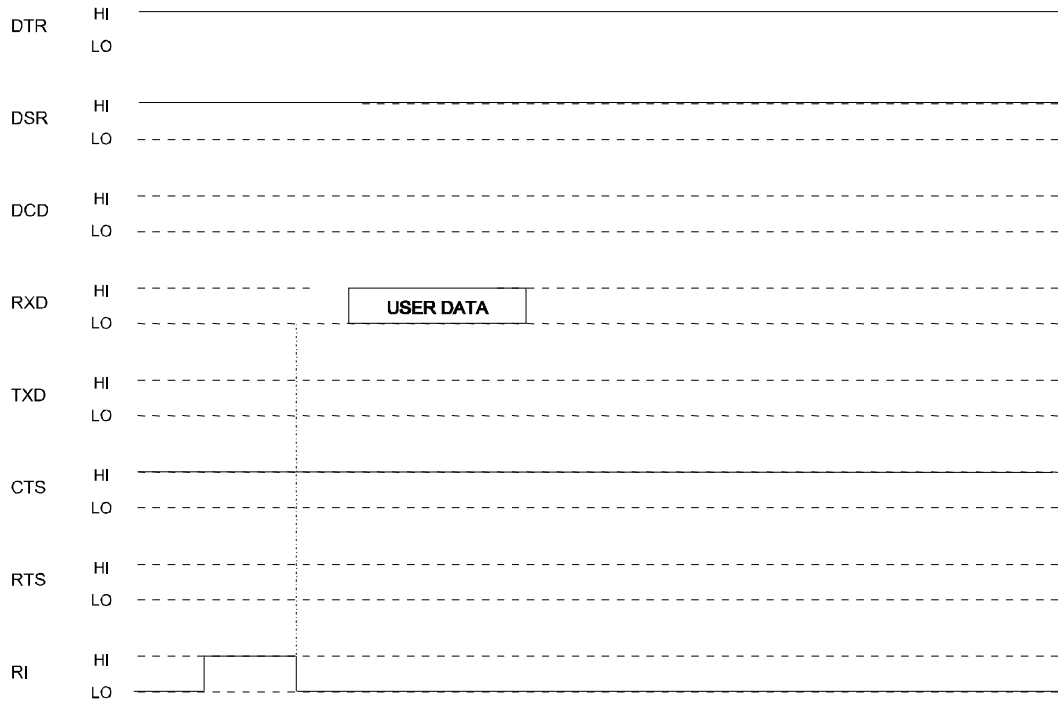
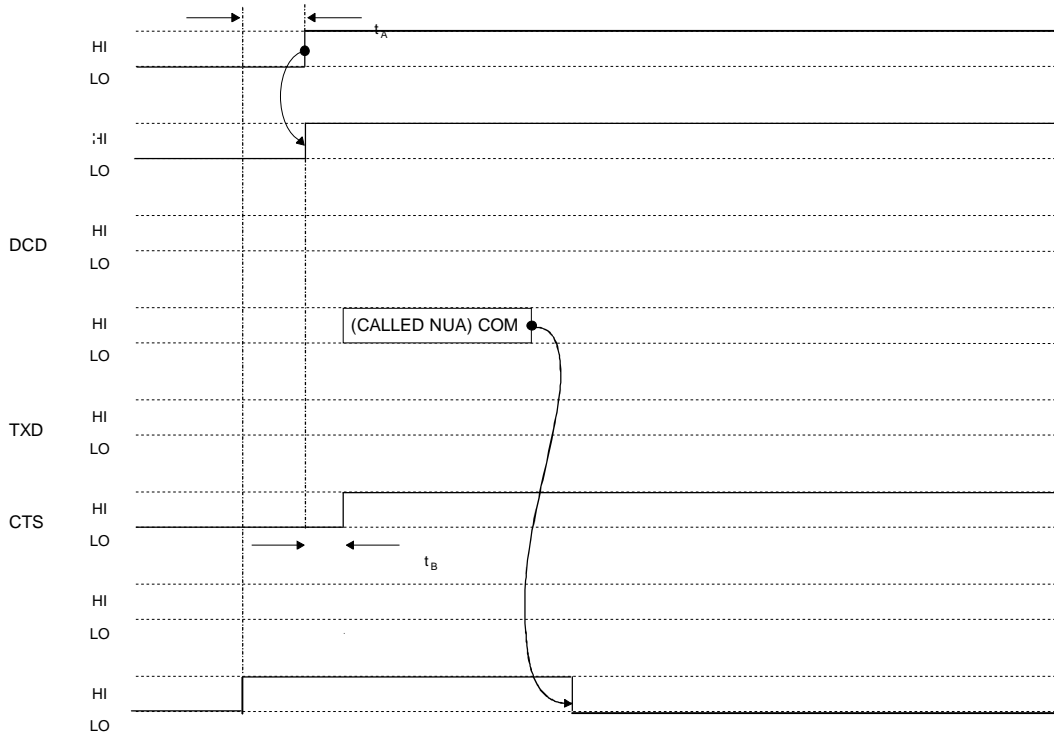


Figure 2 X.28 Incoming call Procedure with Service Signals Disabled (DTR normally high)



$t_A = 0-500\text{ms}$ (if DTR not raised, RI will turn off and call will clear)

$t_B = 0-20\text{ms}$ Time from DSR to CTS

Figure 3 X.28 Incoming Call Procedure with Service Signals Enabled (DTR normally low)

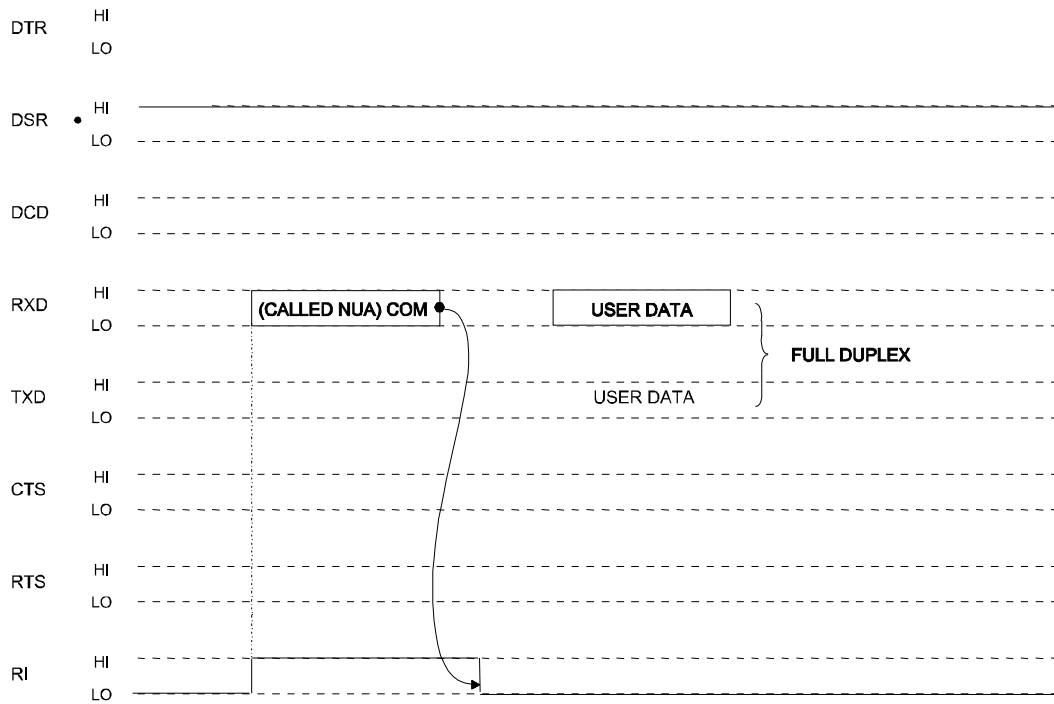
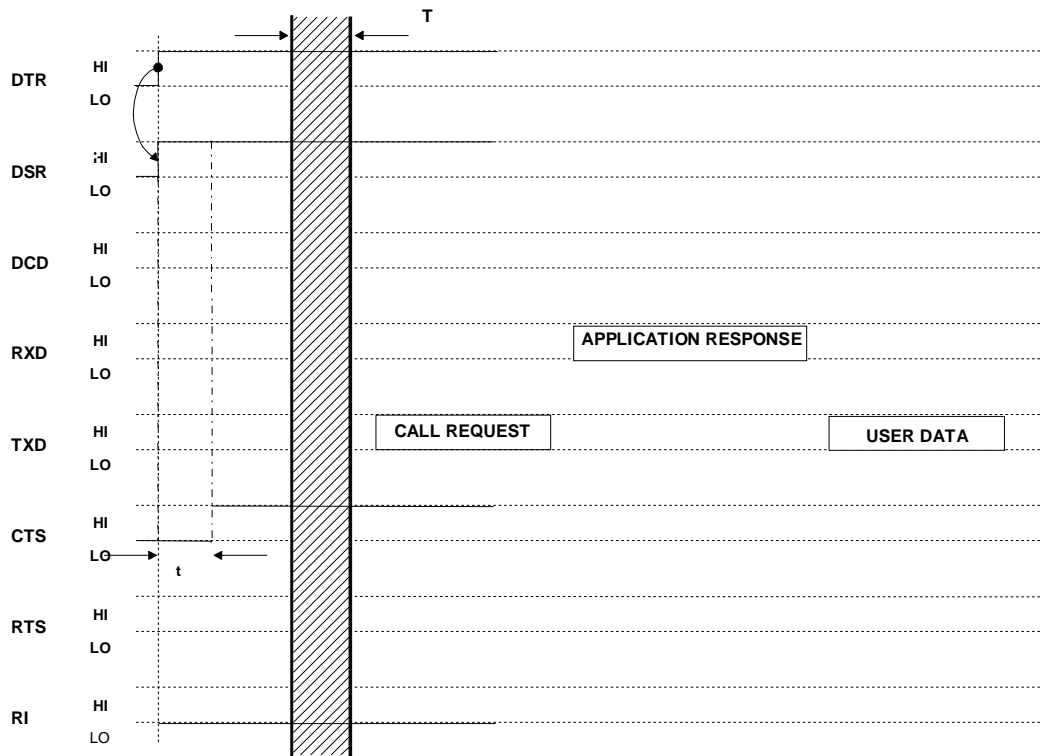


Figure 4 X.28 Incoming Call Procedure with Service Signals Enabled (DTR normally high)



T = indefinite idle period

$t_s = 0-20ms$ Time from DSR to CTS

Figure 5 X.28 Outgoing Call Procedure - Service Signals Disabled

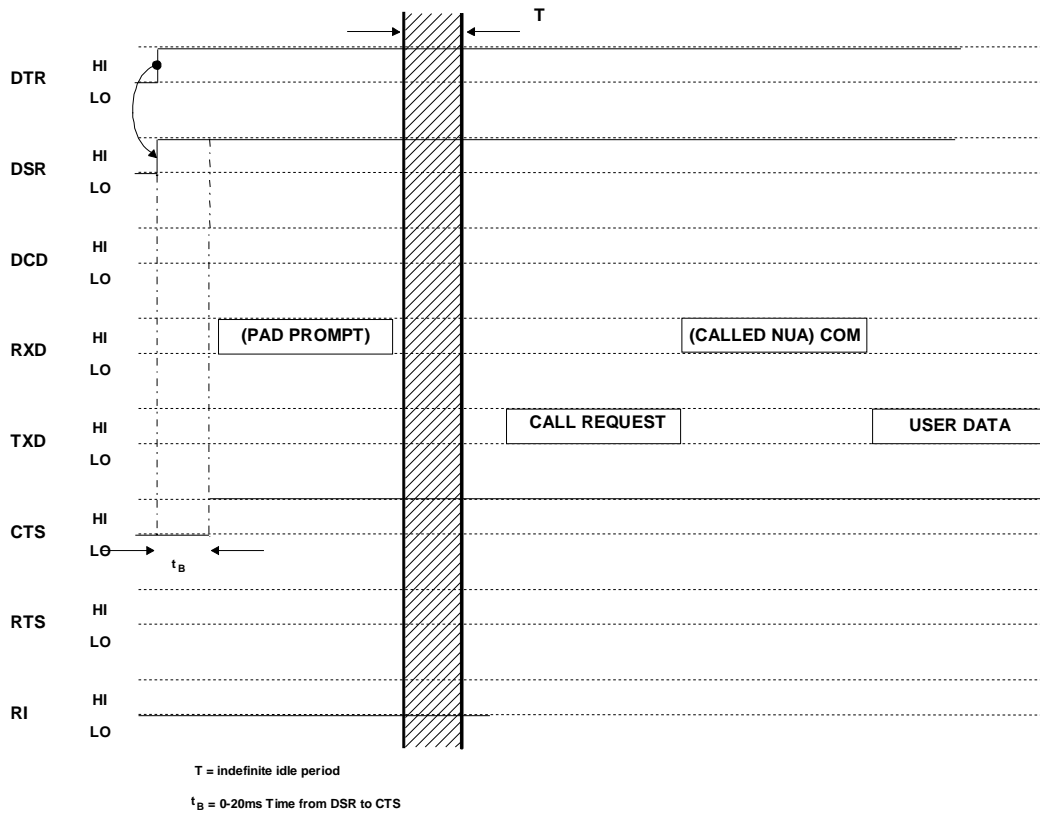


Figure 6 X.28 Outgoing Call Procedure - Service Signals Enabled