

CTNET Setup and Troubleshooting Basics

This Technical Note is pertaining to Unidrive SP and/or Digitax ST Plus that are utilizing CTTNet

CTNet may be used on the SM-Applications module, SM-Applications Plus module, SM-Register, and Digitax ST Plus. This technical note was created to assist with getting the communications working should difficulties be encountered.

For the SM Modules and Digitax ST Plus

For the SM Modules the setup configuration parameters are held in the appropriate menu for the slot where the Second Processor is fitted.

Slot	Menu
1	15
2	16
3	17

For the Digitax ST Plus, menu 17 is reserved for the Motion Processor.

CTNet Diagnostics

The first thing you will want to check is **xx.36** on all of the drives where xx = menu number of the slot the SM-Apps module is placed in. This parameter will give you the CTNet Diagnostic and help pinpoint which node(s) are causing the issue. Any number ≥ 0 is good, any number that is negative means you have an error on your CTNet. This could be indicative of such things such as wiring mistakes, wrong baud rate, invalid CTNet address, no CTNet Sync Setup, Setup Parameters not saved or perhaps requiring a Processor Reset.

Saving the Drive parameters and re-setting the application module

Pr MM.36	Indication
-3	Network reconfiguration issued. The SM-Applications module forced a CTNet network reconfiguration.
-2	Initialisation failure. The SM-Applications module was unable to configure the CTNet interface. Check that the node address and data rate are set correctly.
-1	A network reconfiguration has been detected.
0	The low-level token ring has been established and is active, but the node is not receiving any CTNet data messages.
>0	Indicates the number of CTNet messages being processed every second.

Go to mm.00 and enter in a value of **1001**. Hit the Reset "**Red**" Button on the drive keypad.
Invokes a Drive Reset

Go to mm.00 and enter in a value of **1070**. Hit the Reset "**Red**" Button on the drive keypad.
Invokes a Co-Processor Reset which causes the Co-Processor to re-read the setup info and begin using those new settings.
Where mm.00 is any menu location 0

Table 5.8 CTNet configuration error trip codes

Error	Unidrive	Mentor II	Unidrive SP
Hardware error (See section 5.2.1)	"tr60" Pr 10.20 = 60	"A29" Pr 10.35 = 60	"SLx.Er" Pr MM.50 = 60
Invalid configuration (See section 5.2.2)	"tr61" Pr 10.20 = 61	"A29" Pr 10.35 = 61	"SLx.Er" Pr MM.50 = 61
Data rate mismatch (See section 5.2.3)	"tr62" Pr 10.20 = 62	"A29" Pr 10.35 = 62	"SLx.Er" Pr MM.50 = 62
Duplicate node address (See section 5.2.4)	"tr63" Pr 10.20 = 63	"A29" Pr 10.35 = 63	"SLx.Er" Pr MM.50 = 63
Illegal cyclic data rate (See section 5.2.5)	"tr64" Pr 10.20 = 64	"A29" Pr 10.35 = 64	Not applicable

Checking the Baud Rate

All nodes on the CTNet must be set for the same Baud Rate. Go to xx.24 on all of the drives and verify that all are the same.

Display	Value	Description	Display	Value	Description
5.000	0	5Mbit/s	1.250	2	1.25Mbit/s
2.500	1	2.5Mbit/s	0.625	3	625kbit/s

Checking the CTNet Address

All nodes on the CTNet must have unique addresses. A value of 0 will disable the CTNet for that node. Go to Pr xx.23 on all of the drives and verify that all have unique addresses.

Checking the CTNet Sync Setup

This specifies the synchronization message generation rate for CTNet. **Only one node** on the CTNet network should have this parameter set, go to Pr xx.25.

The format of this parameter is SSFF, where FF defines the Fast Cyclic data rate, and SS defines the Slow Cyclic data rate. So, with a value of 1510, the fast cyclic data is set every 10ms and the slow every 150ms (15 * 10).

Using the POS task with CTNet "Task Priority"

In real high demanding applications where you are using the POS task with CTNet, it is sometimes recommended to set xx.44 = 3 which will make the POS task a higher priority than CTNet. However, this may have a negative affect on the CTNet cyclic communications and cause problems if your CTNet Sync Setup is for fast rates.

Inter-Module Network Wiring between CTNet Devices

Control Techniques has experienced too many CTNet field reports of intermittent CTNet problems only to find upon field examination that the CTNet media being used was not to

Data rate (Mbit/s)	Maximum Insertion Loss Factor (KIL)	Node insertion loss (KN)	Cable insertion loss per metre (KC)
1.25	1000	34.3	2.50
2.5	1000	34.6	3.42
5.0	1000	38.5	6.04

specification. As a result they will not warrant a CTNet communication system that is not using the officially approved CTNet Cable (Green Hose)

Part # CTNet – xxx) where xxx is the length of cable you wish in feet.

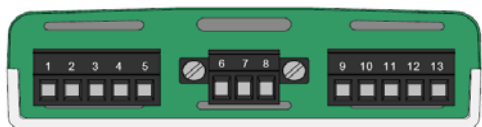


Transmission Line Termination

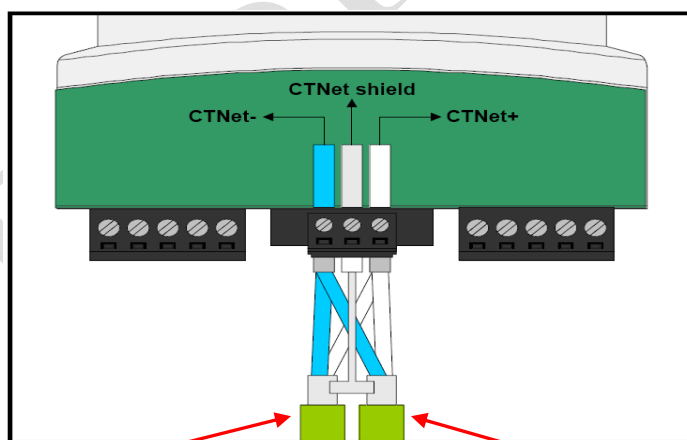
Proper termination of high frequency transmission lines is very important to prevent wave reflections which can result in errant transmissions.

A terminating resistor must to be applied to the extreme ends of all CTNet network segments consisting an 82 ohm 0.25Watt resistor for proper impedance match. These resistors are to be placed across CTNet A and CTNet B lines. Using the correct cable and proper termination will typically promote reliable network communication.

Basic Wiring Recommendations



6	CTNet A	CTNet data line
7	CTNet Shield	Shield connection for CTNet
8	CTNet B	CTNet data line



In – Cable

Out - Cable

Click here more info → [Basic CTNet Practices and Checkout](#)

Physical Network Test

To identify the segment containing the node that is initiating the network reconfigurations:

- 1) Disconnect all segments from hubs and repeaters. This makes each segment into a separate network with its own token ring system and allows the integrity of each segment to be checked.
- 2) Remove all data from the network by disabling cyclic data and all DPL programs. All PC and CTNet HMI nodes should be taken off-line. In this condition, the status of parameters on the Unidrive, Mentor II and Unidrive SP should all indicate 0
- 3) BUS ERR and COM RUN Led's on the CTNet Beckhoff I/O Coupler should be off (if used).

REMOTE I/O

The high-quality Beckhoff I/O system is available for CTNet systems.

Beckhoff systems for CTNet include a bus coupler and a large variety of snap-on terminal blocks allowing up to 256 digital inputs or outputs and up to 100 analog inputs and outputs per bus coupler. Up to 64 Beckhoff I/O systems can be attached to a CTNet network. I/O points can be easily read or written. (Beckhoff I/O for other networks available.)



Click below for more info

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[Using the Beckhoff CTNet I/O](#)

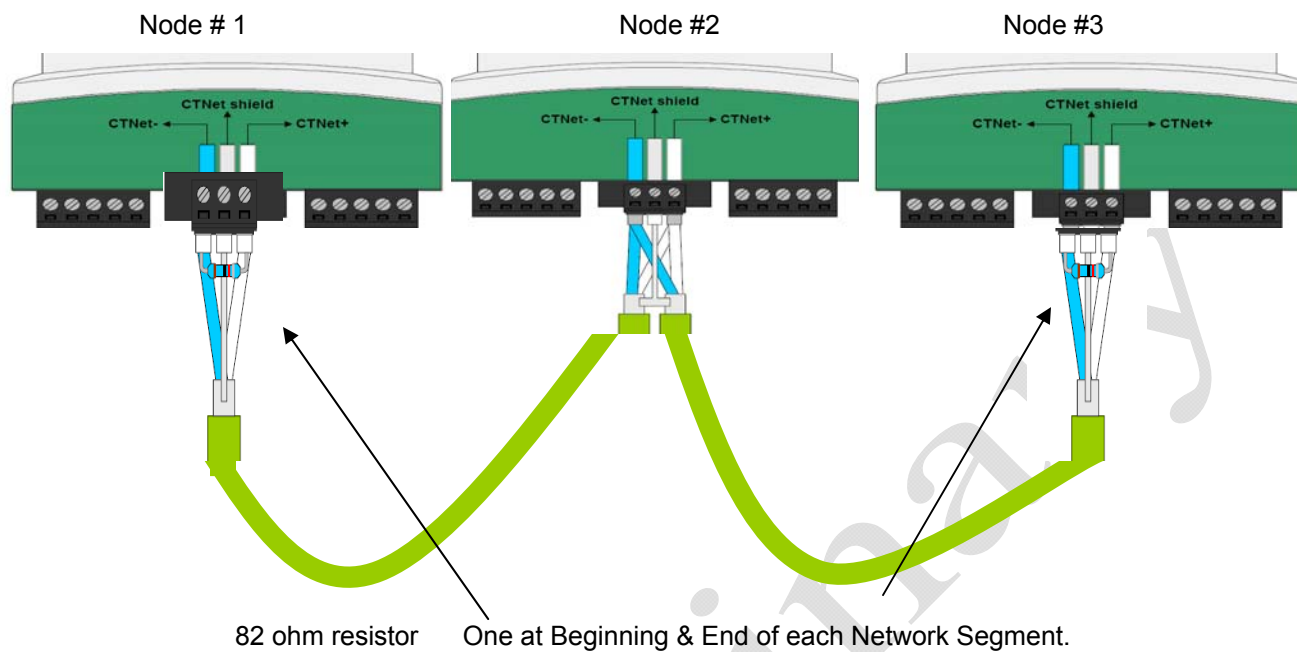
Description	Order Code
Beckhoff Bus Coupler	SSP7200-RevD

If network reconfigurations are still occurring on a segment there is likely to be a problem with the physical wiring on the segment.

Quick Verification of the CTNet Termination

With POWER OFF, disconnect every node from a given segment, using an ohmmeter, you should read approximately 40 ohms ($\frac{1}{2}$ of 82 since there should only be 2 in parallel) across CTNet A and CTNet B. If you read other than this you may have multiple terminating resistors and/or mis-wiring. One must still visually check that the resistor are on the ends of the transmission trunk – one at the beginning and one at the end.

CTNet configuration of 3 nodes with Node #1 being the Master of the CTNet



Node #1	Node #2	Node #3
Address: xx.23 = 1	xx.23 = 2	xx.23 = 3
Baud Rate: xx.24 = 1	xx.24 = 1	xx.24 = 1
CTNet Sync Rate xx.25 = 1510	xx.25 = 0	xx.25 = 0

[Option Module Trip Codes](#)

Supplemental Reference Material

[CTNet User Guide](#) ← click here

- Contains more complete documentation for proper, setup, wiring practices and diagnostic procedures
Highly Recommended reading !!!!

NOTE:

It should be noted that if one is merging new drives (Unidrive SP or DigitAx ST) into a CTNet system with older CTNet products such as Unidrive Classic's UD75, Mentor II or Quantum III with MD29AN, the Beckhoff CTNet coupler or CTIU200 Operator Interface Unit, the hardware Revision levels must be Rev D to ensure full CTNet compatibility. This would include the CT MAU with laptop PCMCIA adaptors.

NETWORK ACCESSORIES

Repeaters

For extending CTNet cable segments and creating star topologies, there are three types of repeaters available:



Description	Order Code
Two-output (3-port) Repeater (Hub)	CTNet-Hub-Rev D
Twisted-pair to Fibre Optic Repeater	CTNet FIB-Rev D
Hybrid Hub for connecting previous versions of CTNet hardware to current versions	CTNet Hybrid Hub

Another more acceptable solution may be to apply a Hybrid Hub Adaptor that would adapt between the new CTNet signal levels to the older revision levels segment.

Click here for more info [CTAN255](#)

PC NETWORK INTERFACE CARD

For desktop and laptop computers, use the USB22-CTNet network card. This interface card permits user specification of the node address, baud rate and IRQ (where applicable).



Network Application Card	Order Code
USB22-CTNet	4500-0100

Questions: Ask the authors ??

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