TISOFT Version Compatibility with TI / Siemens / CTI PLCs

1.1 Overview

TISOFT was originally introduced by Texas Instruments in the 1980's for programming 520 and 530 PLCs. The software went through several revisions between 1988 and 2000. Also during that time, TI (and later Siemens) introduced updated PLCs in both the Series 500 and 505 platforms. This Tech Tip explores compatibility of various TISOFT versions with different PLC models.

1.2 Series 500 PLC Models

In the Series 500 form factor, the following PLC models were produced:

- 520
- 530
- 520C
- 530C
- 530T
- 560/565

Section 1.10 below includes specifications for these models.

1.3 505 PLC Models

In the 505 form factor, the following PLC models were produced:

- 525C
- 525/535
- 545
- 545L ("545 Lite")
- 555
- 575 (VME)

Section 1.11 below includes specifications for these models.

1.4 CTI PLC Models

Beginning in 2007, CTI introduced four 2500 Series® PLC models which are replacements for TI/Siemens 505 form factor PLCs.

2500-C400
2500-C300
2500-C200
2500-C100

Section 1.12 below includes specifications for these models.

1.5 TISOFT Versions

Software details				
Date	Name	Batch File	Order #	SW p/n:
1988	Video Programming Unit	TI530T		2587252-003
1992	TISOFT 2	TI505		2587783-0012
1995	TISOFT 2	TI505	PC505-6250	2587783-0016
1997	TISOFT 2	TI505	PC505-6262	2587783-0026
2000	TISOFT 2	TI505	PC505-6271	2587783-0038

1.6 TISOFT Compatibility with TI500 Series Processors

TISOFT Version	TI500 Series processors supported						Communications Baud
	520	530	520C	530C	530T	560/565	
2.0	✓	✓	✓	✓	✓		9600
4.2	✓	✓	✓	✓	✓	✓	9600, 19200, 38400
5.0	✓	✓	✓	✓	✓	✓	9600, 19200, 38400
6.2	✓	✓	✓	✓	✓	✓	9600-115.2k
7.1	✓	✓	✓	✓	✓	✓	9600-115.2k

1.7 TISOFT Compatibility with TI505 Series Processors

TISOFT Version	TI505 Series processors supported						Communications Baud
	*525C**	525/535	545	545L	555	575	
2.0	✓						9600
4.2	✓	✓	✓			✓	9600, 19200, 38400
5.0		✓	✓			✓	9600, 19200, 38400
6.2		✓	✓	✓	✓	✓	9600-115.2k
7.1		✓	✓	✓	✓	✓	9600-115.2k

1.8 TISOFT Compatibility with CTI 2500 Series® Processors

TISOFT Version	CTI 2500 Series Processors Supported				Communications Baud
	2500-C400	2500-C400	2500-C400	2500-C400	
2.0					9600
4.2					9600, 19200, 38400
5.0					9600, 19200, 38400
6.2	✓	✓	✓	✓	9600-115.2k
7.1	✓	✓	✓	✓	9600-115.2k

1.9 Compatibility Notes

TISOFT V2.0:

- Communicates with a 525-1102 at 9600 baud using the 9-pin to 25-pin TISOFT programming cable and a USB to Serial converter.
- There is no PGMS program management functionality in this version.
- In newer versions of TISOFT, the program files all share the same filename with different .filename extensions.
- In V2.0 the filenames cannot be changed, so you must keep the programs in separate folders and copy them into the TISOFT root directory to use.

TISOFT V4.2

- Could not get online with this version using any combination of different PLC's and different baud rate settings.

The '525C' PLC type nomenclature only exists in TISOFT V2.0 & V4.2. There is no evidence that the hardware of a 525C PLC actually existed other than:

- In TISOFT V2.0 - '525C' exists as a PLC type in 'memory configuration'

- In TISOFT V4.2 - '525C' is displayed as PLC type when '525/535' PLC type is selected in 'memory configuration'

The 525 and 535 PLC's are physically a 505 format piece of hardware, but they show up in the programming software as a 500 Series PLC (520C and 530C).

1.10 Series 500 PLC Models – Specifications

1.1 INTRODUCTION

The 520C/530C/530T Programmable Controllers (P/Cs) and their support equipment are computer-controlled systems that are capable of managing the operation of other systems. These P/Cs execute the same functions as relays, static control, or card logic control systems. They can detect the change in state of input signals from such devices as pushbuttons, limit switches, and sensors. Acting on this information and executing a Relay Ladder Logic (RLL) program stored in memory, the 520C/530C/530T P/Cs produce output signals to drive motor starters, solenoids, and pilot lights, etc., that regulate the operation of various pieces of equipment.

The 520C/530C/530T P/Cs differ from the 520/530 models primarily through the execution of a compiled RLL program, as opposed to using a separate Boolean processor and an interpreter. The 530T is an enhanced version of the 530C that offers the following features:

- The scan time for Boolean logic is reduced significantly (from 4 milliseconds per K words of memory to 0.9 milliseconds per K words of RLL memory).
- The communication ports support baud rates up to 19,200 baud, providing faster communication with the Video Programming Unit (VPU) and other operator interfaces.
- The RLL program can be downloaded to an Electrically Erasable Programmable Read Only Memory (EEPROM).

Table 2-2 520C/530C P/C Features.

FEATURE	520C MODELS		530C MODELS		
	1101	1102	1104	1108	1112
Physical I/O Points	512 (Local Only)*		1023 (Local/Dist)		
RS232/423 Ports	1				
RS422 Port	0	1			
Timers/Counters	60	128		256	400
Drum Instruction	15	30			
One Shot Instr.	60	128		256	400
Bit Shift Regs./ Word Shift Regs. Instr.	15	30	45	60	75
Shift Stages	1023				
Move Word to Table/Move Word from Table Instr.	15	30	45	60	75
Jump (Nested)	8				
Master CR (Nested)	8				
Skip Forward to Label Instr.	16	255			

* The 512 Physical I/O Points for these two models are for a system that uses 32-point modules in an adapted Series 500 16-slot base. In a system that uses 32-point modules in a Model 500-5848 base, the physical I/O points would be equal to 448.

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Table 2-5 520C/530C P/C Memory.

FEATURE	520C MODELS		530C MODELS		
	1101	1102	1104	1108	1112
Ladder Logic Memory Words	1024	2048	4096	8192	12000
I/O Table Words	256				
Variable Memory Words	512	1024	2048	4096	5120
Discrete X/Y Image Register (IR) Points	1023 points (64 words)				
Word WX/WY IR Points	1023 points (1023 words)				
X/Y Force Points	1023 points (64 words)				
WX/WY Force Points	1023 points (64 words)				
Non Retentive Control Relay (C) IR Points	127 (C1 thru C127)/ 8 words	255 (C1 thru C255)/ 16 words			511 (C1 thru (C511)/ 32 words
Retentive Control Relay (C) IR	128 (C128-C255)/ 8 words	256 (C256 - C511)/ 16 words			512 (C512-C1023)/ 32 words
Control Relay Force Points	255/ 16 words	511/ 32 words			1023/ 64 words
Timer Counter Preset Words	60 words	128 words		256 words	400 words
Timer Counter Current Words	60 words	128 words		256 words	400 words
Drum Step Preset Words	15 words	30 words			
Drum Step Current Words	15 words	30 words			
Drum Counter Preset Words	240 words	480 words			
Drum Counter Current Words	15 words	30 words			
Status Words	11 words		18 words		
Total User Memory	3455 words	5444 words	8523 words	14923 words	20107 words

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Table 1-1 Model Differences

Features	PLC Model					
	PPX:520C –1102	PPX:530C –0014	PPX:530C –1108	PPX:503C –1112	PPX:530T –1104	PPX:530T –1112
Total User Memory (words)	5444	8523	14923	20107	8523	20107
Ladder Logic Size	2048	4096	8192	12000	4096	12000
Physical I/O	512†	1023	1023	1023	1023	1023
Discrete/Word I/O	1023	1023	1023	1023	1023	1023
Control Relays	511	511	511	1023	511	1023
V-Memory (words)	1024	2048	4096	5120	2048	5120
Timers/Counters	256	256	256	400	256	400
Drums	30	30	30	30	30	30
One Shot	128	128	256	400	128	400
SHRB/SHRW	30	45	60	75	45	75
MWTT/MWFT	30	45	60	75	45	75
JMP (nested)	8	8	8	8	8	8
MCR (nested)	8	8	8	8	8	8
SKP/LBL	255	255	255	255	255	255
Status Words	11	18	18	18	18	18
RS-232-C/423 Ports	1	1	1	1	1	1
RS-422 Ports	1	1	1	1	1	1

† Local I/O only. The 512 I/O points for this model are for a system using 32-point modules in an adapted TI500 16-slot base. A system using 32-point modules in a PPX:500–5848 14-slot base can only have 448 I/O points.

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1.11 Series 505 PLC Models – Specifications

Table 1-1 CPU Specifications

Feature	545–1103/1105	545–1104/1106	555–1103	555–1104	575–2104
User Memory	96 Kbytes	192 Kbytes	384 Kbytes	1920 Kbytes	832 Kbytes
Boolean Scan	0.33 ms/K	0.16 ms/K	0.07 ms/K	0.07 ms/K	0.9 ms/K
Digital I/O Points	1024	2048	8192	8192	8192
Analog I/O Points	1024	1024	8192	8192	8192
Control Relays	4096	32768	32768	32768	23552
Timers/Counters	1024	20480	20480	20480	20480
Integer and Floating-Point	Yes	Yes	Yes	Yes	Yes
PID Loops	16	64	64	64	64
Analog Alarms	32	128	128	128	128
SFPGMs/SFSUBs	64/64	1023/1023	1023/1023	1023/1023	1023/1023
Local I/O	Series 505	Series 505	Series 505	Series 505	VME
505 Remote I/O	—	15 Bases	15 Bases	15 Bases	15 Bases [1,4]
PROFIBUS-DP I/O [2]	32 Devices [3]	112 Devices	112 Devices	112 Devices	112 Devices [3,4]
Communications	Ethernet H1, TIWAY, TCP/IP, Modbus, PROFIBUS-FMS	Ethernet H1, TIWAY, TCP/IP, Modbus, PROFIBUS-FMS	Ethernet H1, TIWAY, TCP/IP, Modbus, PROFIBUS-FMS	Ethernet H1, TIWAY, TCP/IP, Modbus, PROFIBUS-FMS	Ethernet H1, TIWAY, TCP/IP, Modbus, PROFIBUS-FMS
Local Comm. Ports	1 RS-232, 1 RS-232/422/485	1 RS-232, 1 RS-232/422/485	1 RS-232, 1 RS-232/422/485	1 RS-232, 1 RS-232/422/485	2 RS-232 1 RS-422
Baud Rates	up to 38,400	up to 38,400	up to 38,400	up to 38,400	up to 38,400
Portable EEPROM	128 K; 256 K	128 K; 256 K	128 K; 256 K	128 K; 256 K	—
On-board EEPROM	–1105: 96 K	–1106: 192 K	—	—	—
Multiple CPUs	No	No	No	No	Yes
Fault Relay	No	No	No	No	Yes
Real-Time Clock Resolution/Accuracy	10 ms ±5 min/mo	10 ms ±2.2 min/mo	10 ms ±2.2 min/mo	10 ms ±2.2 min/mo	100 ms ±2.2 min/mo
Replaceable battery	1103: Internal 1105: Front	1104: Internal 1106: Front	Yes, internal	Yes, internal	On chassis
Flash O/S EEPROM	Yes: 545–1105	Yes: 545–1106	No	No	No

1 Requires optional PPX:575–2126 Series 505 remote I/O annex card.
2 The number for devices supported includes both masters and slaves. (The actual number that you can connect may be less, depending on the type of slave and the memory requirements of each.)
3 Requires optional PPX:505–CP5434–DP PROFIBUS-DP I/O annex card.
4 The 575 CPU does not support simultaneous use of 505 Remote I/O and PROFIBUS-DP I/O.

Table 1-2 CPU Specifications

Feature	555–1105	555–1106	575–2105	575–2106
User Memory	384 Kbytes	1856 Kbytes	832 Kbytes	1856 Kbytes
Boolean Scan	0.07 ms/K	0.07 ms/K	0.45 ms/K	0.45 ms/K
Digital I/O Points	8192	8192	8192	8192
Analog I/O Points	8192	8192	8192	8192
Control Relays	32768	32768	23552	23552
Timers/Counters	20480	20480	20480	20480
Integer/Floating-Point	Yes	Yes	Yes	Yes
PowerMath	Yes	Yes	Yes	Yes
PID Loops	128	128	64	64
SmarTune (PID loops)	Yes	Yes	No	No
Fast Loops	128	128	No	No
Analog Alarms	512	512	128	128
SFPGMs/SFSUBs	1023/1023	1023/1023	1023/1023	1023/1023
Local I/O	Series 505	Series 505	VME	VME
Series 505 Remote I/O	15 Bases	15 Bases	15 Bases [1,4]	15 Bases [1,4]
PROFIBUS-DP I/O[2]	112 Devices	112 Devices	112 Devices [3,4]	112 Devices [3,4]
Communications	Ethernet H1, TIWAY, TCP/IP, Modbus, PROFIBUS-FMS	Ethernet H1, TIWAY, TCP/IP, Modbus, PROFIBUS-FMS	Ethernet H1, TIWAY, TCP/IP, Modbus, PROFIBUS-FMS	Ethernet H1, TIWAY, TCP/IP, Modbus, PROFIBUS-FMS
Local Comm. Ports	1 RS-232, 1 RS-232/422/485	1 RS-232, 1 RS-232/422/485	2 RS-232 1 RS-422	2 RS-232 1 RS-422
Baud Rates	up to 115,200	up to 115,200	up to 115,200	up to 115,200
Portable EEPROM	128 K; 256 K	128 K; 256 K	—	—
On-board EEPROM	384 Kbytes	1856 Kbytes	832 Kbytes	1856 Kbytes
Multiple CPUs	No	No	Yes	Yes
Fault Relay	No	No	Yes	Yes
Real-Time Clock Resolution/Accuracy	10 ms ±2.2 min/mo	10 ms ±2.2 min/mo	10 ms ±2.2 min/mo	10 ms ±2.2 min/mo
Replaceable Battery	Yes, front bezel	Yes, front bezel	Yes, on chassis	Yes, on chassis
Flash O/S EEPROM	Yes	Yes	Yes	Yes

1 Requires optional PPX:575–2126 Series 505 remote I/O annex card.
2 The number for devices supported includes both masters and slaves. (The actual number that you can connect may be less, depending on the type of slave and the memory requirements of each.)
3 Requires optional PPX:505–CP5434–DP PROFIBUS-DP I/O annex card.
4 The 575 CPU does not support simultaneous use of 505 Remote I/O and PROFIBUS-DP I/O.

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1.12 CTI 2500 Series® PLC Models – Specifications

2500-Cxxx Programmable Controllers Model Comparison

Feature	2500-C100	2500-C200	2500-C300	2500-C400
User Program RAM	128K	256K	512K	3072K
Discrete I/O Points	1024	2048	8192	8192
Word I/O Points	1024	1024	8192	8192
Control Relays	4096	32,768	32,768	32,768
Retentive Control Relays	1024	4096	4096	4096
Timers/Counters	1024	20,480	20,480	20,480
Compiled SF	Yes	Yes	Yes	Yes
Cyclic PID Loops	16	64	128	128
RLL PID Loops (Fast Loops)	0	0	384	384
Analog Alarms	32	128	512	512
Special Function Programs	64	1023	1023	1023
Special Function Subroutines	64	1023	1023	1023
Remote I/O	None	Up to 15 bases	Up to 15 bases	Up to 15 bases
Profibus I/O	None	Up to 112 bases	Up to 112 Bases	Up to 112 Bases
Maximum Serial Port Data Rate	115.2K	115.2K	115.2K	115.2K
On-board User Flash	Yes	Yes	Yes	Yes
Local Ethernet Port	Yes	Yes	Yes	Yes
USB Port	Yes	Yes	Yes	Yes
Battery	5yr storage (0-60C), 3yr continuous@25C, 6mos@60C			