

Knowledge Base Document

Technical Support Department, U79, Newtown

Title: ESA HMI RS485 to CTNet routing communications protocol

Document	General
Category:	

Product Category:

Communication

Credits Jose Garcia

Revision History

Revision	Date	Revising Author	Released for Website ?	Mark X	Authorised By	Comments
1.0	March 05	Jose Garcia	CTSupport CTVip Both None			

Summary of Contents

The Italian manufacturer of HMIs, ESA, has developed a communications protocol that allows access to different Unidrive SP parameters using an extension of CT Modbus protocol.

The main advantage of this is that parameters from different drives can be accessed from the RJ45 port of the Unidrive SP that works as a "routing drive".

The current document shows the user how to configure the ESA HMI terminal in order to access parameters from 3 different Unidrives SP.

Hardware/Software requirements.

- 3 SM-Applications modules with system file version 1.03.04 or higher.

- 3 Unidrive SPs with firmware version 1.07.01 or higher.
- 1 CT Serial Communications Lead (Part Number: 4500-0087).
- CTNet connection between the 3 SM-Applications.
- VT50 HMI terminal. (ESA HMI)
- VTWIN 4.75 or higher (ESA configuration software).

Step-by-Step guide.

- 1. Hardware Overview.
- 2. Setting communications parameters in the drives.
- 3. Configuring the HMI.

Appendix: Pin-Outs.

1. Hardware Overview.

- 1.1 Set 3 Unidrive SPs with 3 SM-Applications modules linked through CTNet, as per figure 1.
- 1.2 Connect the VT50 ESA HMI to Unidrive SP1. See appendix at the end of this document for pin-out information.



Fig. 1. Hardware overview.

2. Setting communications parameters in the drives.

2.1 The parameters to configure in the drives are shown in Table 1.

Table 1				
Parameters	Description	SP 1	SP 2	SP 3
#11.23	Serial address	1 (default)		
#11.24	Serial Mode	RTU (default)		
#11.25	Baud Rate	19200 (default)		
#15.23	CTNet addr. Slot1			31
#15.24	CTNet Baud Rate			2500 (default)
#16.23	CTNet addr. Slot 2		22	
#16.24	CTNet Baud Rate		2500 (default)	
#17.23	CTNet addr. Slot 3	13		
#17.24	CTNet Baud Rate	2500 (default)		

3. Configuring the HMI.

- 3.1 Open VTWIN .
- 3.2 From the Project selection Screen choose VT50(Rev. 2) and click OK (see Fig. 2)

X [®] VT₩IN		
File Edit Tools View Option	s: 7	
	<u> </u>	
Compon	Project	
ADAPTER		
CANOPEN	S Project selection	2 🞽
	New Last projects Existing	f
	Order by Name Name Description	Number of 🔨
MOTOR DRIVE	TIGHT VT50 (CAN NETWORK) VT	000000
🕹 🦲 OTHERS	Fault VT50 (Rev.1) VT	000002 😑
PLC	VT50 (Rev.2) VT	000000
PRINTER		<u>></u>
PROFIBUS		
PC	CD	
₽ VT	mbar : 65.8	
	Shift F1 55 F2 F3 F4 F5 F5 10 T	
	<u>QK</u> <u>c</u> ancel <u>2</u>	

Fig.2.

3.3 From the next screen that comes up, double-click on the MOTOR DRIVE folder, then on the CONTROL TECHNIQUES folder. Highlight the CT Modbus protocol (see Fig. 3)





3.4 Using the mouse, drag the CT Modbus icon up to the MSP port. When the mouse button is released, the CT Modbus protocol will be attached to the MSP port, hanging underneath. See Figs. 4 and 5.



Fig.4.



Fig.5.

3.5 In order to better understand the "routing capability" within this article, it makes sense to rename the "*CT Modbus_a*" protocol already created as "CT Modbus SP1 Routing drive" for example. To do this, right-click with the mouse and choose the Rename option. The result is shown in Fig. 6



Fig.6.

3.6 Double-click on the previous highlighted protocol. The Device Properties window will come up. On the comment box, something meaningful can be written. On the *Device Address* field, the SP RS485 Serial address must be introduced (Pr. 11.23). In this article, SP1 is referred as the SP with serial address number 1. See Fig. 7.

🗊 Device prop	erties	? 🗙
Device		
Name	CONTROL TECHNIQUES:CT M	lodbus SP1 Routing
Туре	CONTROL TECHNIQUES:CT M	odbus
Comment	SP1 Routing Drive. RS485 addr	ess No. 1
Communication	parameters	
Device address	[1
		R
Device address	: (DEC): 1-247	
	<u>OK</u> ancel	2

Fig. 7.

3.7 Highlight the MSP port. Double-click on it. The *Port Properties* window will come up. The Communications parameters are set by default for the Unidrive SP apart from the Baud Rate that will be set to 19,200 bit/s. See Fig. 8.

🕖 Port properties	;	?	×	
Communication param	neters			
Baud rate		19200 bit/s 💌]	
Parity		NONE]	
Data Bit		8]	
Stop Bit		2]	
Operator panel prope	rties			
Protocol timeout (mse	c)	500	-	
Protocol timeout (msec) (DEC): 500-5000				
<u>0</u> K	<u>C</u> ancel	2		

Fig. 8.

3.8 Highlight the VT50 icon and double click on it, the *Project Components* window will come up. See Figs. 9 and 10.



Fig. 9.

V T50 (Rev.2)_a		
Project Tools Configuration Wind	ow ?	
Draiget companynte		
- Components		
Variables Pages		New
Page sequences Memory areas		Delete
Exchange areas Information messages		Edit
Text lists	- Information	Сору
Automatic operations		
		2
	L1	+

Fig. 10.

- 3.9 Six new variables will be created. Each variable will be a particular parameter from the same of different Unidrives SP. The variables to be created will be:
 - #18.11(SP1) -----> Pr. 18.11 from Unidrive SP number 1
 - #20.21(SP1) -----> Pr. 20.21 from Unidrive SP number 1
 - #18.11(SP2) -----> Pr. 18.11 from Unidrive SP number 2
 - #20.21(SP2) -----> Pr. 20.21 from Unidrive SP number 2
 - #18.11(SP3) -----> Pr. 18.11 from Unidrive SP number 3
 - #20.21(SP3) -----> Pr. 20.21 from Unidrive SP number 3
- 3.10 For **#18.11(SP1)** variable, the *Project Components: Variable* window will look like the one shown in Fig. 11. After filling all the fields, press the *Accept* and *Ok* buttons in this order.

🖻 Project c	component: Variables	×
<u>G</u> eneral <u>L</u> i	imit values	
Name Device	#18.11(SP1) Comment CONTROL TECHNIQUES:CT Modbus SP1 Routing Drive	
FC 03-16: r	read/write 16-bit parameter	
Address Menu	18 Parameter 11	
Valid range: Menu (DEC Parameter (:): 0 - 99 [DEC]: 0 - 99	
	<u>Ok</u> <u>Cancel Accept</u> <u>2</u>	



3.11 For **#20.21(SP1)** variable see Fig. 12.

Project component: Variables	? 🗙
<u>G</u> eneral] Limit values	
Name #20.21(SP1) Device CONTROL TECHNIQUES:CT Modbus SP1 Routing Drive	Co <u>m</u> ment
FC 03-16: read/write 32-bit parameter ▼ Type Dword	_
Address Menu 20 Parameter 21	
Valid range: Menu (DEC): 0 - 99 Parameter (DEC): 0 - 99	
<u> </u>	



3.12 For **#18.11(SP2)** variable see Fig. 13

🖻 Project component: Variables 📀 💽
General Limit values
Name #18.11(SP2) Device CONTROL TECHNIQUES:CT Modbus SP1 Routing Drive
Data area
FC 64: RS485 to CTNet routing
Address
Menu 18 Parameter 11 Routing Slot No. 3 CTNet Node no. 22
Valid range: Menu (DEC): 0 - 99 Parameter (DEC): 0 - 99 Routing Slot No. (DEC): 0 - 3 CTNet Node no. (DEC): 0 - 255
Ok Cancel Accept ?

Fig. 13.

3.13 For **#20.21(SP2)** variable see Fig. 14

Project component: Variables	? 🗙
<u>G</u> eneral Limit values	
Name #20.21(SP2) Device CONTROL TECHNIQUES:CT Modbus SP1 Routing Drive	Comment
FC 64: RS485 to CTNet routing Type Register	
Address Menu 20 Parameter 21 Routing Slot No. 3 CTNet Node no. 22	
Valid range: Menu (DEC): 0 - 99 Parameter (DEC): 0 - 99 Routing Slot No. (DEC): 0 - 3 CTNet Node no. (DEC): 0 - 255	
<u> D</u> k <u> C</u> ancel <u> A</u> ccept <u> 2</u>	



🖻 Project c	omponent: Variables	? 🛛
<u>G</u> eneral <u>L</u> ir	mit values	
Name Device	#18.11(SP3)	Co <u>m</u> ment
Data area		
FC 64: RS4	185 to CTNet routing	-
Address	10 Parameter 11	
Routing Slot	No. 3 CTNet Node no. 31	
Valid range: Menu (DEC Parameter (Routing Slo CTNet Nod): 0 - 99 DEC): 0 - 99 t No. (DEC): 0 - 3 e no. (DEC): 0 - 255	
	<u>Ok</u> <u>C</u> ancel <u>Accept</u> <u>?</u>	

Fig. 15.

3.15 For **#20.21(SP3)** variable see Fig. 16

Project component: Variables	? 🛛
<u>G</u> eneral Limit values	
Name #20.21(SP3) Device CONTROL TECHNIQUES:CT Modbus	SP1 Routing Drive
FC 64: RS485 to CTNet routing	ype Register 💌
Menu 20 Parameter Routing Slot No. 3 CTNet Nod	21 e no. 31
Valid range: Menu (DEC): 0 - 99 Parameter (DEC): 0 - 99 Routing Slot No. (DEC): 0 - 3 CTNet Node no. (DEC): 0 - 255	
<u>0</u> k <u>C</u> ancel	Accept 2



3.16 After declaring these six variables, the Project components window should show them within the Object list box. See Fig. 17.

Project components		
Components Variables Pages Page sequences Memory areas Exchange areas Information messages Direct commands Text lists Equations Automatic operations	Object list #18.11(SP1) #18.11(SP3) #20.21(SP1) #20.21(SP1) #20.21(SP2) Information CONTROL TECHNIQUES:CT Modbus SP1 Routing Drive FC 03-16: read/write 16-bit parameter-Word Menu 18 Parameter 11	New Delete Edit Copy

Fig. 17.

3.17 The next step is to design the pages on the HMI. Double-click on *Pages* from the *Project components* window. The *Project component: Pages* window will come up. Click *OK*. See Fig. 18.

📱 VT50 (Rev. 2)_a		- - ×
Project Tools Configuration Window	N 7	
	Project component: Pages	3
Project components Components Variables Page sequences Memory areas Exchange areas Information messages Direct commands Text lists Equations Automatic operations	General Help page Edit mode General Comment Page number 1 Comment Name PAGE_0001 Update interval 500 msec	
	<u>k</u> Cancel <u>Accept</u> 2	
	+ L	



3.18 Page No. 0001 screen comes up. Click on the *Multilanguage label* icon from the main menu. See Fig. 19.

🖩 VT50 (Rev.2)_a
Project Tools Object Fields Edit Page Configuration Window ?
ing see states in the second s
Multilanguage label
Project components
Components Object list
Variab 🗟 Page No. 0001
Page s
Excha
Direct
Text lis
Autom
shift Esc 🖌 🍺 🏠
insert mutualarguage taber L.: A = 1, T = 4 T

Fig. 19.

3.19 Click on the white zone within the Page No. 0001 and introduce the information as shown in Fig. 20. Then click on the *Numeric field* icon from the main menu.

📱 VT50 (Rev. 2)_a	
Project Tools Object Fields Edit Page Configuration Window ?	
Project components	
Components	
Variab 🗗 Page No. 0001	
Page s Memoi Excha Inform Direct Text lis Equati Autom Help A Shift F1_Esc F2 F3 F4 F5 Info T	
Insert numeric field	



3.20 Having already selected the *Numeric Field*, click on the white zone within the *Page No. 0001*, beside the "=" symbol. Make sure that the variable name matches with the description previously typed on that page as shown in Fig. 21. Then click *Accept* and *OK*.

🖻 Numeric field	? 🛛
<u>G</u> eneral <u>M</u> ode Automat	atic Operation
Name PAGE_0001	1-FIELD_0002
Variable selection	
Source	
Device	
Variable	
#18.11(SP1)	<u>N</u> ew <u>E</u> dit
- Display	
🔲 Leading zeros	Numeric format
Visible digits 7	Decimal
Rounded digit 0	
Format ##	######
Preview	1234567
·	

Fig. 21.

3.21 Proceed similarly as per point 3.19, to introduce the information as shown in Fig. 22.





3.22 Proceed in the same way as per point 2.20. Make sure that the variable name matches with the description previously typed on that page as shown in Fig. 23. Then click *Accept* and *OK*.

Numeric field	2×
General Mode Automatic Operation	
Name PAGE_0001-FIELD_0004 Comment	
Variable selection	
Source	
Variable	
#20.21(SP1) <u>New Edit</u>	
Display	
Leading zeros Numeric format	
Rounded digit	
Format #######	
Preview 1234567	

Fig. 23.

3.23 Page No. 0001 will look like the one shown in Fig. 24 eventually





3.24 Proceed as previously and create Page No 0002 as per Fig. 25, 26, 27 and 28.



Fig. 25.

Numeric field		?
<u>G</u> eneral <u>M</u> ode A	utomatic Operation	
Name PAGE	0002-FIELD_0002	
Variable selection - Source		
Device	•	
Variable		
#18.11(SP2)	▼ <u>N</u> ew <u>E</u> dit	
Display	Normali Ganat	
Visible digits	7 Fixed point	
Decimal digit	0	
Format	+#######	
Preview	+123456	
	Qk Cancel Accept 2	

Fig. 26.



Fig. 27.

🖻 Numeric field	[?]	×
<u>G</u> eneral <u>M</u> ode Automat	tic Operation	
Name PAGE_0002	2-FIELD_0004	
Variable selection		
Source		
Device		
Variable		
#20.21(SP2)	<u>N</u> ew <u>E</u> dit	
- Diselau		
Leading zeros	Numeric format	
Visible digits 7	Fixed point	
Decimal digit		
Format		
Preview	+123456	
	120500	
J		
	<u>Ok</u> <u>Cancel Accept</u> <u>?</u>	

Fig. 28.

3.25 Page No. 0002 will look like the one shown in Fig. 29.

🗗 Page No. 00	02	
	ESA VIIIO	Help
shift		Info



3.26 Similarly, proceed as before so as to create Page No. 0003, which will look like the one shown in Fig. 30.





3.27 Close the Page No. 0003 window and then highlight the *Page sequences* option from the *Project components* window and double-click on it as shown in Fig 31.

₩ VT50 (Rev.2)_a		
Project Tools Configuration Wi	ndow ?	
🚠 📼 🖀 - 📍		
Project components		
Components	Object list	
Variables Pages		New
Page sequences Memory areas		<u>D</u> elete
Information messages Direct commands		Edit
Text lists Equations	momaton	Сору
Automatic operations		
		2
(60,7)-(40,7)		0 +

Fig. 31.

3.28 When the *Project component: Sequences* window comes up, choose Page No. 0003 as a *Stop Page* as shown in Fig.32. Then click *OK*.

🖻 Project compon	ent: Sequences	? 🛛
No. 1		
Name SEQ	_0001	Comment
Pages		
Start/Stop	sequence O Rar	idom sequence
Start page	Page No. 0001	•
Stop page	Page No. 0001	•
	Page No. 0001	
	Page No. 0002 Page No. 0003	
<u>0</u> k	<u>C</u> ancel Acce	pt <u>?</u>

Fig. 32.

3.29 Click on the *Compile project* button from the main menu as shown in Fig. 33.

₩ VT50 (Rev.2)_a	
Project Tools Configuration Window ?	
Compile project	
Project components	
Components	
Variables SEQ_0001	New
Page sequences Memory areas Exchance areas	<u>D</u> elete
Information messages	<u>E</u> dit
Text lists File of the second	Сору
	2
Compile current project [□ X = 95, Y =	0 +



3.30 Before compiling make sure you save your project. See Fig. 34.





3.31 On the *PROJECT COMPILER* window, click on *Compile* as shown in Fig. 35.

PROJECT COMPILE	R			
Stop first step incorrect	C <u>N</u> ever	⊂ <u>A</u> fter	1 incorrect step(s)	
Status messages				
[
<u> </u>	iompile	itop <u>S</u> ave	<u><u> </u></u>	

Fig. 35.

3.32 When the compilation process is finished, click on *Exit* as shown in Fig 36.

	PROJECT COMPILER	X
	-Stop ☞ first step incorrect C Never C After 1 incorrect step(s) ☞ Display warnings	
	- Status messages	
	COMPILING EQUATIONS COMPILING AUTOMATIC OPERATIONS COMPILING AUTOMATIC OPERATIONS VARIABLE GROUPS COMPILING TIMERS COMPILATION OF PROTOCOL FRAMES COMPILING HEADER POINTERS COMPILING FINAL CRC VALUE	
	Total text memory 262144 Byte, Used 1190 Byte (0.453949%), Free 260954 Byte (99.546051%) ERRORS: 0 WARNINGS: 0 COMPILATION TERMINATED	
L	Compile Stop Save Exit	



3.33 After the project is compiled, it needs to be downloaded to the HMI. To do that click on the *Download project* icon from the main menu as shown in Fig. 37.

📱 VT50 (Rev.2)_a	
Project Tools Configuration Window ? 	
Download project	
Project components	
Components Object list	
Variables SEU_0001 Pages	New
Page sequences Memory areas Evolutions areas	<u>D</u> elete
Direct commands	<u>E</u> dit
Text lists Pages 1–3	Сору
Automatic operations	2
P Download current project □ □ × = 95, Y =	0 +

Fig. 37.

- 3.34 Before downloading the program, make sure the HMI is powered down. Also, connect the VT 50 terminal from the MSP port (DB25 standard connector) to the PC serial port using a standard serial cable. For pin-out information consult the Appendix at the end of this document.
- 3.35 Before powering it up hold the F5 key from the keypad.
- 3.36 Power the VT50 unit up while keeping the F5 key pressed.
- 3.37 The VT50 goes into a booting sequence mode and then asks for the download method. F1=MODEM F2=PC.
- 3.38 Press F2 (downloading via PC).
- 3.39 A message on the display will appear saying "WAIT LOCAL CONNECT".
- 3.40 Back in the VTWIN software, make sure than the *Port number* and the *Bit rate* are set accordingly on the PC side and then click *OK**. See Fig. 38.

E DOWNLOADER						
Serial line	Port:	Serial COM1	•	Bit rate:	19200	•
Update operat	ing unit program	□ Update operating unit firmware				
					<u>C</u> an	cel

Fig. 38.

(*) Note: Make sure that the unit has the most updated firmware.

3.41 The *DOWNLOADER* window will appear temporarily and when the download is completed it will disappear. See Fig. 39.

🛥 DOWNLOADER					
Terminal model	VT50 V1	512K Flash			
Boot version	2.1	Boot date	28-03-2003		
Sending project					
		43 %			
		<u>C</u> ancel	l≽		

Fig. 39.

3.42 Once the project is downloaded into the VT50 unit, providing the Unidrive SP and the SM-Applications have been properly configured, and the appropriate communications cable is used (see appendix), the different drive parameters could be monitored from the HMI screen.

Note 1: PLC registers (menus 70 to 75) on the SM-Applications can also be accessed using the FC64: RS485 to CTNet routing protocol.

Note 2: PLC registers from a local SM-Applications can be accessed by setting CTNet Address No. to "0" only in the VTWIN configuration software. (A local SM-Applications is one SM-Applications fitted in on one of the slots of the Unidrive SP that works as a "routing drive"). Parameter xx.23 in the Unidrive SP that acts as a "routing drive" must contain a valid CTNet node address (non equal to 0) at all times.

Appendix: Pin-Outs

a) Communications lead pin-out between the VT50 and the Unidrive SP



Fig. 40. Pin-out between the MSP port of VT50 unit and the RJ45 port of Unidrive SP

b) Configuration lead pin-out between the PC and the VT50



