Application Note
CTAN #300

The Application Note is specific to the Commander SK

SM-Ethernet Quick Start Guide

Scope

The SM-Ethernet field bus communication option has proved to be a popular option for all of the current Control Techniques products that support the SM-Option format. Our experience at Grand Island supporting the SM-Ethernet with the Commander SK has turned up a number of extra "challenges" that this application note will address.

This note recommends and describes setting up the first node at IP address **192.168.1.100**, a second node at **192.168.1.101**, at third node at **192.168.1.102** and so forth. This results in all the SM-Ethernet IP address being on segment "**192.168.1.xxx**".

This revision of this application note provides guidance in configuring and making persistent an IP address on a segment different than the "**192.168.1.xxx**" segment.

This note is focuses on using the SK Keypad, but CT Soft can be used for part of the configuration Note that ***one critical section*** recommends that the steps be performed with the SK Keypad ***ONLY***. If the reader chooses to ignore this guidance when changing the IP address, expect difficulties saving these changes through a power cycle.

The Web browser does not provide a menu zero listing, and would be awkward to use to implement this configuration, and is not recommended.

Background

Unlike the Unidrive SP, the Commander SK does not make all of the "advanced parameters" readily available for inspection and/or modification with the user interface provided with the drive. And many times, one is setting up the Commander SK for use with an option like the SM-Ethernet module, and the cover is off the drive. It is not "obvious" how to use this interface under those conditions.

The SK is simply not as "observable" as the Unidrive SP when using the SM-Options unless one is using the LCD Keypad, which can greatly speed up your efforts. See **CTAN313**

To finish the challenges to overcome, the SK North American defaults select latching (three wire) start / stop logic, and this suitable for use with the SM-Ethernet option, if that use involves starting and stopping over the Ethernet link.

Instructions:

Set up menu zero.
Using the SK keypad, or CTSoft, set the following parameters to the indicated values. Note that two different scenarios are common with SK and SM-Ethernet. One scenario is remote-only (simplest) and the other scenario is an analog input for local and the Ethernet link for remote. This choice affects the control strategy regarding the values actually used to actually start and stop the SK as well as set the remote speed target, and is described later in this application note.

#0.05	(#11.27) to value	Pr	for Remote operation only	} Pick one
	OR (not both)	AV.Pr or AI.Pr	for a Local / Remote	
#0.10	(#11.44) to value	L3		
#0.11	(#06.04) to value	0		
#0.41	(#05.14) to value	Fd (2)	optional, useful if one has not yet connected a motor	

#0.71	to value	06.40
#0.72	to value	06.42
#0.73	to value	06.43
#0.74	to value	15.10
#0.75	to value	15.11
#0.76	to value	15.12
#0.77	to value	15.13
#0.78	to value	15.32
#0.79	to value	1.00

} Ethernet Module setup

Cycle the power to save this configuration.

*After restoring power use the SK Keypad **only** to,:*
Set (and save) the parameter configuration as follows:

#0.61	(#06.40) to value	"Off"	insure latching is "Off"
#0.62	(#06.42) to value	129	initial control word value for Drive Enable via Comm Link
#0.63	(#06.43) to value	"On"	enable Control Word Control
#0.64	(#15.10) to value	192	(**)
#0.65	(#15.11) to value	168	(**)
#0.66	(#15.12) to value	1	(**)
#0.67	(#15.13) to value	100	(**) first SM-Ethernet module, 101 for the next one …
#0.68	(#15.32) to value	"On"	Re-initializes and saves internal configuration, and self-resets.
#0.69	(#01.00) to value	1000	and press the red "Stop" button, resets to zero (0).

** Pay attention here if you are ***NOT*** using the default IP address of "**192.168.1.100**". This is where you assign your intended IP address.

Note that the more a user is familiar with CT products and software, the more likely it becomes this same user will not follow the last block of instructions exactly as written and attempt to do all of this over an Ethernet link.

The SK Keypad is best for observing #15.32 (at #0.68) resetting to "Off", and will not lose communication with the SK after this same reset (and internal save). This loss of communication is where so many users have trouble with making an IP address change persistent after a power cycle.

For more information on how to access parameters outside menu 0, consult **CTAN272**

Short video illustrating this procedure→ 

Commander SK keypad operation with the cover removed:

The following diagram illustrates the button mappings

The keys micro-switches still work even without the cover in place over them!

So, one could still perform the previous configuration with the cover off, with these illustrations as a guide.

Modbus TCP/IP Users

1. Configure your controller to write to IP address "**192.168.1.100**" (or the IP address assigned) a speed target value to #01.21 (Register 40121) in a frequency x10 format (300 = 30.0 Hz. 600 = 60.0 Hz.). The result is observable at Pr18 with the SK keypad.

2. Configure your controller to write to IP address "**192.168.1.100**" (or the IP address assigned) a control word value to parameter #06.42 (Register 40642). With Pr 72 is set to a value 6.42 then this it is observable at Pr62 with the SK Keypad.

   If parameter #0.05 is set to "Fr" (remote only) and with a connection between terminal B2 and B4 (hardware enable):

   - A value of "128" (*inhibit*) observed at Pr62 (#06.42) will show " ih **0.0**" on the display.
   - A value of "129" (*enable*) observed at Pr62 (#06.42) will show "rd **0.0**" on the display.
   - A value of "131" (*run forward*) observed at Pr62 (#06.42) will show "Fr **x.x**" on the display, where **x.x** is the target frequency in #0.18 (#01.21).
   - A value of "137" (*run reverse*) observed at Pr62 (#06.42) will show "Fr **- x.x**" on the display, where **x.x** is the target frequency in Pr18 (#01.21).

   If parameter #0.05 is set to "AV.Pr" or set to "AI.Pr" and with a connection between terminal B2 and B4 (hardware enable):

   - A value of "384" (*inhibit*) observed at Pr62 (#06.42) will show " ih **0.0**" on the display.
   - A value of "385" (*enable*) observed at Pr62 (#06.42) will show "rd **0.0**" on the display.
   - A value of "387" (*run forward*) observed at Pr62 (#06.42) will show "Fr **x.x**" on the display, where **x.x** is the target frequency in #0.18 (#01.21).
   - A value of "393" (*run reverse*) observed at Pr62 (#06.42) will show "Fr **- x.x**" on the display, where **x.x** is the target frequency in Pr18 (#01.21).

To obtain an overview of internal details discussing such topics as the **Control and Status Words** click here → **CTAN320**

Ethernet IP Users

1. Configure your scanner for two, 32-bit cyclic words (eight bytes) out and (eight bytes) in to IP address "**192.168.1.100**" (or the IP address assigned), using input assembly object 100 and output assembly object 101. Note that for a Rockwell PLC, these are "double integer" (DINT) transfers.

   - The first OUTWORD is the control word
   - The second OUTWORD is the target frequency (proportional to target speed)
   - The first INWORD is the status word
   - The second INWORD id the actual (post-ramp) frequency (proportional to actual speed)

2. Configure your controller to write to IP address "**192.168.1.100**" (or the IP address assigned) a speed target value via the first OUTWORD to #01.21, in a frequency x10 format (300 = 30.0 Hertz, 600 = 60.0 Hertz). The result is observable at Pr18 with the SK keypad.

3. Configure your controller to write to IP address "**192.168.1.100**" (or the IP address assigned) a control word value via the second OUTWORD to parameter #06.42. With Pr 72 set to a value 6.42 then this is observable at Pr62 with the SK Keypad.

   If parameter #0.05 is set to "Fr" (remote only) and with a connection between terminal B2 and B4 (hardware enable):

   - A value of "128" (*inhibit*) observed at Pr62 (#06.42) will show " ih **0.0**" on the display.
   - A value of "129" (*enable*) observed at Pr62 (#06.42) will show "rd **0.0**" on the display.
   - A value of "131" (*run forward*) observed at Pr62 (#06.42) will show "Fr **x.x**" on the display, where **x.x** is the target frequency in #0.18 (#01.21).
   - A value of "137" (*run reverse*) observed at Pr62 (#06.42) will show "Fr **- x.x**" on the display, where **x.x** is the target frequency in Pr18 (#01.21).

   If parameter #0.05 is set to "AV.Pr" or set to "AI.Pr" and with a connection between terminal B2 and B4 (hardware enable):

   - A value of "384" (*inhibit*) observed at Pr62 (#06.42) will show " ih **0.0**" on the display.
   - A value of "385" (*enable*) observed at Pr62 (#06.42) will show "rd **0.0**" on the display.
   - A value of "387" (*run forward*) observed at Pr62 (#06.42) will show "Fr **x.x**" on the display, where **x.x** is the target frequency in #0.18 (#01.21).
   - A value of "393" (*run reverse*) observed at Pr62 (#06.42) will show "Fr **- x.x**" on the display, where **x.x** is the target frequency in Pr18 (#01.21).

To obtain an overview of internal details discussing such topics as the
Control and Status Words click here → **CTAN320**

Note to both Ethernet TCP/IP and EthernetIP users:

When you begin to work with the next Commander SK / SM-Ethernet pair, be sure you are writing to the unique IP address, which should be **192.168.1.101** for the second one (Pr67 = **101**), **192.168.1.102** for the third one (Pr67 = **102**), and so forth (if you are using the default segment "**192.168.1.xxx**" and following the recommendation given in this application note).

If you are experienced enough to be assigning your own IP addresses, this reminder should suffice. Pay particular attention to the "Instruction" section of this application note regarding use of the SK Keypad for getting your IP address saved, when it is not "at default" and especially if it will no longer be at the default segment of "**192.168.1.xxx**". Experience with users in North American has indicated this is a troublesome area.

Note to Local / Remote (#0.05 at AV.Pr or AI.Pr) users

Any time parameter #6.43 and #6.42 bit seven (7) are not **BOTH** "On" the SK will be using the configured analog input for the speed target, as well as terminal I/O.
Parameter #6.43 can be controlled directly by a digital input on the SK for terminal selection of Hand (local) or Local independent of the Ethernet master, if needed.

Other Resources

To obtain a manual for the SM-EtherNet Module click here→ **EtherNet Module Manual**
To obtain the Commander SK User Guide click here→ **CommSK User Guide**
To obtain the SK Advanced User Guide click here→ **CommSK Advanced User Guide**
To obtain the CTSoft click here→ **CTSoft**

If All Else Fails:

Default the SK to European or North American defaults and try one more time before calling Technical Support. A number of issues have been corrected by a fresh start at a known configuration

Pr 29 (#11.43) to a value Eur (1) Load European defaults.
USA (2) Load North American defaults

Note: The drive should be disabled during this programming (should indicate ih)
Note also that Pr2, Pr 7 and Pr 8 will likely need attention after this change, but this is the easiest way to get the drive mode into the proper configuration.

Repeat steps starting back in **Instructions**

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