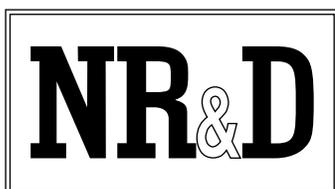


A66SM

Installation and Programming Manual

This Manual describes the A66SM Communications Adapter for the Altivar® 66 Variable Frequency Drive, its uses and set up.

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1 Introduction

The A66SM communications adapter card connects an Altivar 66 variable frequency drive controller (see Figure 1 below) to a SY/MAX PowerLogic or PNIM multidrop network. It will allow the PowerLogic or PNIM bus master to adjust drive operational parameters, command, control, and monitor drive operation, and diagnose drive fault conditions.

The A66SM is a Type 3 PCMCIA card with an attached 3 meter cable terminated with a 15-pin D-Sub connector. The A66SM is designed to operate in the PCMCIA slot of an I/O extension module (VW3A66201T or VW3A66202T) or communication carrier module VW3A66205 (not the drive's main PCMCIA slot), and requires drive firmware revision 3.2 or later.

NOTE: This manual is not intended to be used as a guide for drive operations. It is written to explain connection of the A66SM to the PowerLogic or PNIM network, and to describe the mapping of the drive parameters into registers. For information on drive operation, refer to Instruction Bulletin VD0C06S304B (Altivar 66 User's Manual).

Figure 1: Altivar 66 variable frequency drive.



2 Installation

Refer to Section 1 of Instruction Bulletin VD0C06S308 for installation instructions for the A66SM communication card in the Altivar 66 drive controller. Please note the following additions/modifications to the Square D installation instructions:

- For the A66SM communications card to operate correctly, the drive into which it is installed must have revision 3.2 or later firmware. This may be viewed on the Drive Identification menu page, for example “ATV66U41N4, CT, **V3.2**”
- In the drive’s communications setup (Menu 11), set Protocol to Modbus+ and Address to the desired slave address. Set the Timeout to a value appropriate for the system’s scan rate. When the drive is under Serial Link Control, this timeout value will determine how long the drive will run without receiving communications from the PNIM or PowerLogic bus master before shutting down. The Peer Cop and Global Data parameters are not used and should be set to NO and zero respectively. When the card is recognized by the drive, the drive’s Comm. State menu (menu 12) will reflect the selected address and show a constantly changing token counter.
- The adapter supports the SY/MAX PNIM and PowerLogic serial protocols at 9600 bits per second, 8 data bits, 1 start bit, 1 stop bit, and even parity. The port settings cannot be changed in the field.

The A66SM PCMCIA card has an attached cable which terminates in a 15-pin D-Subminiature male plug. LAN Connection to this plug is as shown in Figure 2 on page 8. Connection to this plug may be made using Phoenix Contact part number FLKM-D 15 SUB/B, or by building a cable to make the following connections:

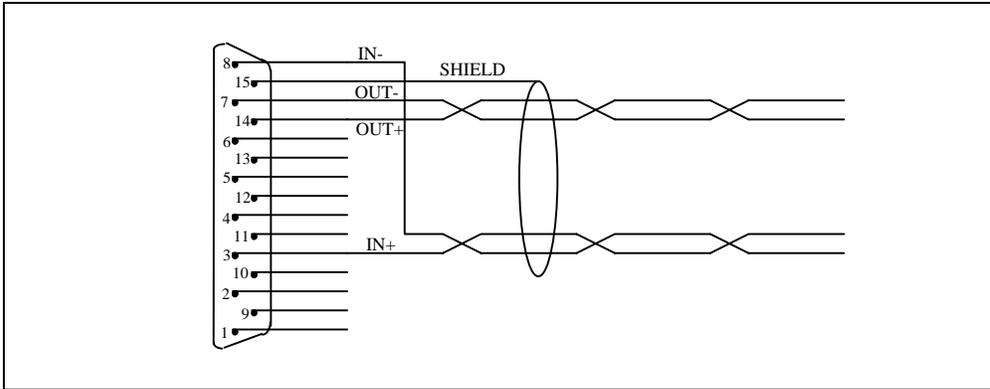


Figure 2: Connection of PowerLogic network to A66SM DB-15 connector.

Two-Wire Connection

The A66SM may be run on a two wire RS-485 network, with Circuit Monitors, and probably other devices which use PNIM protocol. Two wire RS-485 communication to a PowerLogic network may only be done using the PNIM protocol (PowerLogic protocol is full-duplex).

To connect the A66SM to a 2-wire network, its transmit and receive pairs must be electrically connected near the connector (i.e. IN+ to OUT+ and IN- to OUT-). Thus, the (+) wire of the RS-485 network connects to both IN+ and OUT+, and the (-) wire connects to both IN- and OUT-.

The essential command and monitoring parameters of the Altivar 66 drive controller are mapped into registers as described in Table 1, beginning on page 11. The most basic motor control can be accomplished using registers 2021, 2022, and 2032:

NOTE: This manual references bits in the standard SY/MAX notation where the least significant bit (lsb) is bit 1 and the most significant bit (msb) is bit 16. Instruction Bulletin VD0C06S309 (Modbus+ PCMCIA manual) uses the notation of the lsb being bit 0 and the msb bit 15.

Register 2021 contains a bitmap of discrete drive controls. Bits 2 and 3 of register 2021 put the drive controller in SLC (Serial Link Control) mode when set, and release the drive controller into local control mode when cleared. (**NOTE:** SLC mode is not available when the drive controller has its PI regulator enabled.) In SLC, the drive receives its operational parameters (speed, direction, etc.) from the A66SM, whereas in local control mode serial communications can only be used to gather data.

Bit 6 of Register 2021 starts the motor when set, and stops the motor when cleared. Register 2022 sets the reference frequency (thus, speed) of the drive. Bit 2 of Register 2032, when set, commands the drive to run in the reverse direction.

While in SLC mode, the drive controller will stop the motor if it does not receive valid communication from its master within the Communications Timeout interval (programmed through the keypad, in Menu 11). Bit 5 of Register 2021, when set, disables this serial link timeout feature, such that if serial communications are lost, the drive will continue to run. This mode of operation **is not recommended** for normal use. During loss of control, it is almost always safest for the operation to cease until repairs can be made.

A communications timeout fault, or any other resettable fault can be cleared by setting Bit 1 of register 2021. This bit will automatically return to 0 after being set.

For further information on register significance, and drive operation refer to Instruction Bulletin VD0C06S309 (Modbus+ PCMCIA manual).

The A66SM card has two LED indicators. The green indicator will flash as PNIM or SY/MAX communications packets are received. The red indicator will flash if a packet or

command is in error or otherwise not recognized by the card. If the last message sent to the card has an error, the red light may stay on until a new, good, packet is received. Errors which will light the red LED include: Checksum error, inter-character timeout error, attempt to read or write an unsupported or illegal register, or an illegal SY/MAX opcode.

Table 1: Register map for the A66SM

Address	Bit	Description
2001	---	High Speed
2002	---	Low Speed
2003	---	Accel 1
2004	---	Decel 1
2005	---	Accel 2
2006	---	Decel 2
2007	---	Slip Compensation
2008	---	IR Compensation
2009	---	Profile
2010	---	Voltage Boost
2011	---	Damping
2012	---	Bandwidth
2013	---	Motor Overload
2021	1	Drive Reset
	2	Assignment of logic commands over link (DLI)
	3	Assignment of references over link (FLI)
	4	Alternate ramps (Ramp 2)
	5	Suppression of communication control (NTO)
	6	Run/Stop Command
	7	Braking by DC injection (DCB)
	8	Orient Stop
	9	Freewheel Stop
	10	Fast Stop
	11	Command of voltage reduction
	12	Multi-Motors
	13	Multi-Parameters
	15	External fault command (EFL)
	16	Peer Cop Adjustment storage
	2022	---
2023	2-4, 7-9	Command of LOx / ROx state
2024	---	Command of AO1 Level
2025	---	Current Limit level
2026	---	Motoring torque limit level
2027	---	Regenerating torque limit level
2029	---	Voltage reduction level
2030	---	Command of AO2 level
2031	---	Command of AO3 level

Table 1: Register map for the A66SM (cont'd)

2032	1	Command of current limit
	2	Run direction
	4	Command of torque limit
	9	Elapsed timer reset
2041	1	Mode in which all commands are assigned
	2	Drive controller ready (RDY or SLC)
	3	Fault (FLT)
	4	Reset authorized
	5	Brake engage relay state
	6	Forced local
	7	NTO
	8	Resettable fault
	9	Motor running
	10	Actual rotation direction
	11	DC injection braking
	12	Steady state
	13	Motor thermal overload alarm
	15	Current limit
	16	No line power (NLP)
	2042	---
2043	---	Output current
2044	2-9	Display of logic input activation (LI1 - LI8)
	10-11	Display of logic output activation (LO1 - LO2)
	12-15	Display of relay activation (R1 - R4)
2045	---	Value of analog input (AI1)
2046	---	Motor torque
2047	---	Speed reference
2048	1	Local command mode T/K
	2	Logic commands over link (DLI)
	3	Reference commands over link (FLI)
	4	Dynamic braking
	5	Fast stop
	6	Power loss, ramp stop
	7	Gating state
	8	Orient complete
	9	Deceleration (DEC)
	10	Acceleration (ACC)
	11	Multi-motor or
	12	Multi-parameter selected
	14	Drive controller thermal fault
	15	Torque limit
	16	Stopping by the keypad

Table 1: Register map for the A66SM (cont'd)

2049	1	Jog
	2	Shutdown complete
	3	Cycle complete
	4	Alternate ramp
	5	Auto/Manual
	6	Frequency level 1 attained
	7	Frequency level 2 attained
	8	Current level 1 attained
	9	Current level 2 attained
	10	Thermal level 1 attained
	11	Thermal level 2 attained
	12	No ramp follow
	13	Run output command
	14	Rotation direction
2050	1	Drive faulted, stopped
	5	State of adjustment semaphore
	6	State of command semaphore
2051	---	Display of fault causing trip
2052	---	Display of present faults
2053	---	Output power
2054	---	Output voltage
2055	---	Line voltage
2056	---	Bus voltage
2057	---	Motor thermal state value
2058	---	Drive controller thermal state value
2059	---	Elapsed time (hours)
2060	---	Elapsed time (minutes)
2061	---	Output speed (rpm)
2062	---	Machine frequency reference number (customer units)
2063	---	Machine frequency (customer units)
2064	---	Value of analog input AI2
2065	---	Value of analog input AI3
2066	---	Value of analog input AI4
2067	---	Value of AO1
2068	---	Value of AO2
2069	---	Value of AO3
2070	---	Speed ramp output
2072	---	Nominal motor voltage range
2075	---	Number of motor or parameter set selected
2076	---	Cycles step number in progress
2077	---	Preset speed number in progress

Table 1: Register map for the A66SM (cont'd)

2101	---	Assignment of AI1
2102	---	Assignment of AI2
2103	---	Assignment of AI3
2104	---	Assignment of AI4
2105	---	Assignment of AO1
2106	---	Assignment of AO2
2107	---	Assignment of AO3
2108	---	Assignment of LO1
2109	---	Assignment of LO2
2112	---	Assignment of R1
2113	---	Assignment of R2
2114	---	Assignment of R3
2115	---	Assignment of R4
2116	---	Assignment of LI1
2117	---	Assignment of LI2
2118	---	Assignment of LI3
2119	---	Assignment of LI4
2120	---	Assignment of LI5
2121	---	Assignment of LI6
2122	---	Assignment of LI7
2123	---	Assignment of LI8
2141	---	Indicates the position of marker on 1 of 8 past faults
2142	---	Past fault 1: Drive controller state
2143	---	Past fault 1: Name of fault
2144	---	Past fault 2: Drive controller state
2145	---	Past fault 2: Name of fault
2146	---	Past fault 3: Drive controller state
2147	---	Past fault 3: Name of fault
2148	---	Past fault 4: Drive controller state
2149	---	Past fault 4: Name of fault
2150	---	Past fault 5: Drive controller state
2151	---	Past fault 5: Name of fault
2152	---	Past fault 6: Drive controller state
2153	---	Past fault 6: Name of fault
2154	---	Past fault 7: Drive controller state
2155	---	Past fault 7: Name of fault
2156	---	Past fault 8: Drive controller state
2157	---	Past fault 8: Name of fault

Table 1: Register map for the A66SM (cont'd)

2201	---	Drive controller horsepower (hardware rating)
2202	---	Drive controller horsepower (configured rating)
2203	---	Drive controller voltage range
2204	---	Line frequency recognized
2205	---	Drive controller maximum rated frequency
2206	---	Drive controller nominal current
2207	---	Drive controller maximum current
2212	---	Memory card option
2213	---	Communication carrier option
2214	---	Presence of keypad
2215	---	I/O Extension option card
2217	---	PCMCIA communication card