ENCLOSURE SPECIFIC DATA
for
Vertex
QDMA
Portable Auto-Acquisition Antenna

Revision: 5 May 2014

1.0 INTRODUCTION

1.1 Appendix Organization

This appendix is provided as a supplement to the baseline RC4000 User's Manual which describes the PCB board stack that is common to all systems. Section 2 describes the mechanical aspects of the controller, while section 3 describes the electrical connections.

2.0 MECHANICAL

2.1 RC4000 Antenna Controller Chassis and Lid

The ACU is mechanized as an embedded controller. The PCB board stacks are located inside a weatherproof enclosure. Figure 1 shows the ACU.

Figure 1

The chassis of the RC4000 provides provisions to mount the enclosure that include #10-32 hardware on the bottom of the enclosure, as well as the sides. Figure 2 shows the enclosure drawings.

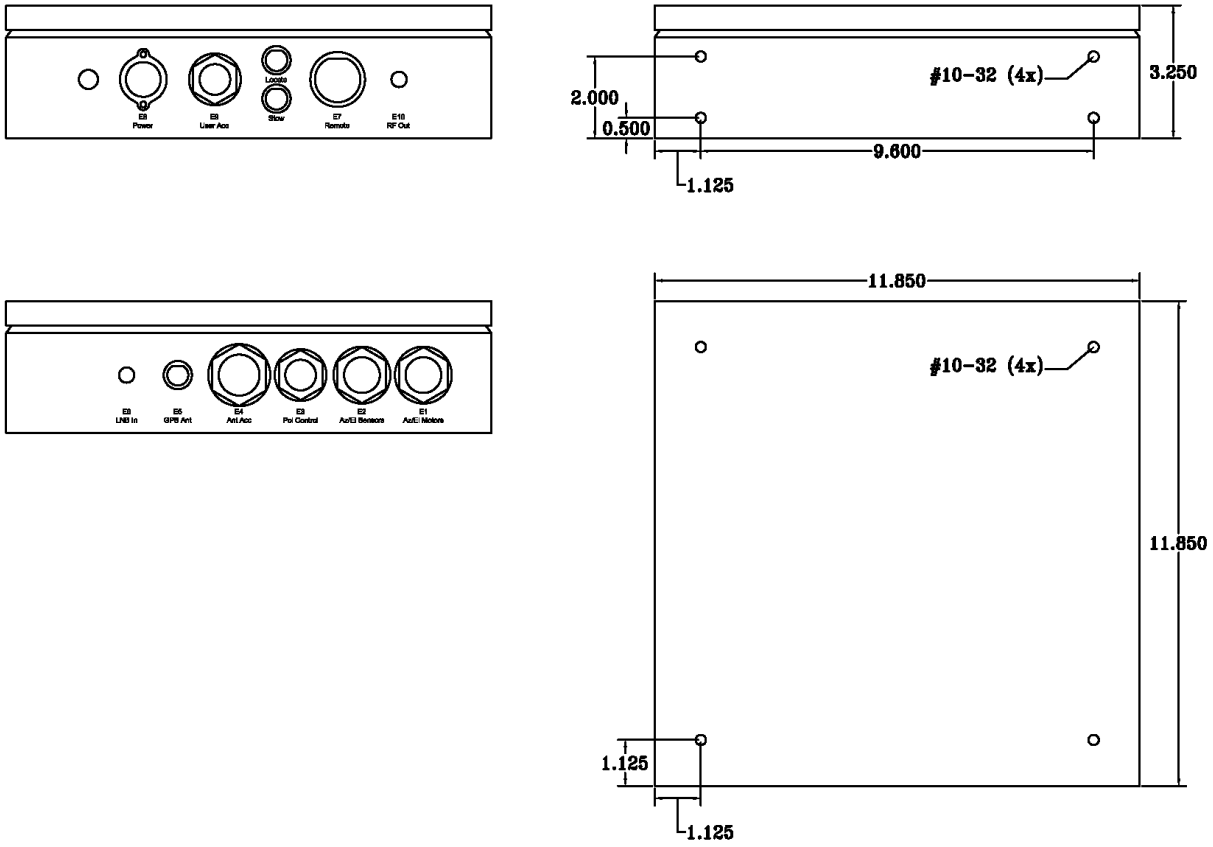


Figure 2

2.2 Torque for Lid Screws

This section describes the appropriate procedures and torque recommendations for installing the RC4000 Embedded controller lid in order to ensure that it is securely fastened and water-tight against moisture.

Please observe the following steps with installing the controller lids:

1. Place the lid on the controller, making sure that it is square with the chassis.
2. Start threading all four screws and hand-tighten ONLY until the washers touch the lid. DO NOT OVERTIGHTEN.
3. Set the torque screwdriver to 2 in-lbs. and tighten the screws in a cross pattern.
4. Adjust the torque screwdriver to 4 in-lbs. and tighten the screws two turns at a time, repeating the cross pattern, until the torque is reached.
5. Set the torque screwdriver to 6 in-lbs. and tighten the screws two turns at a time, again repeating the cross pattern, until the torque is reached.

The above procedure has consistently resulted in securely fastened lids that are water tight against moisture.

2.3 RC4000 End Panels

The RC4000 end panels are where the connectors are located. The User Interface end panel contains connectors that that the user may need to frequently have access to, such as the AC power, ethernet, and buttons. The other end is the Antenna Interface end panel, which includes connectors that primarily go to the antenna itself, such as the motor and sensors connections.
Figure 3 shows both end panels, with the Antenna Interface on bottom and the User Interface on top.

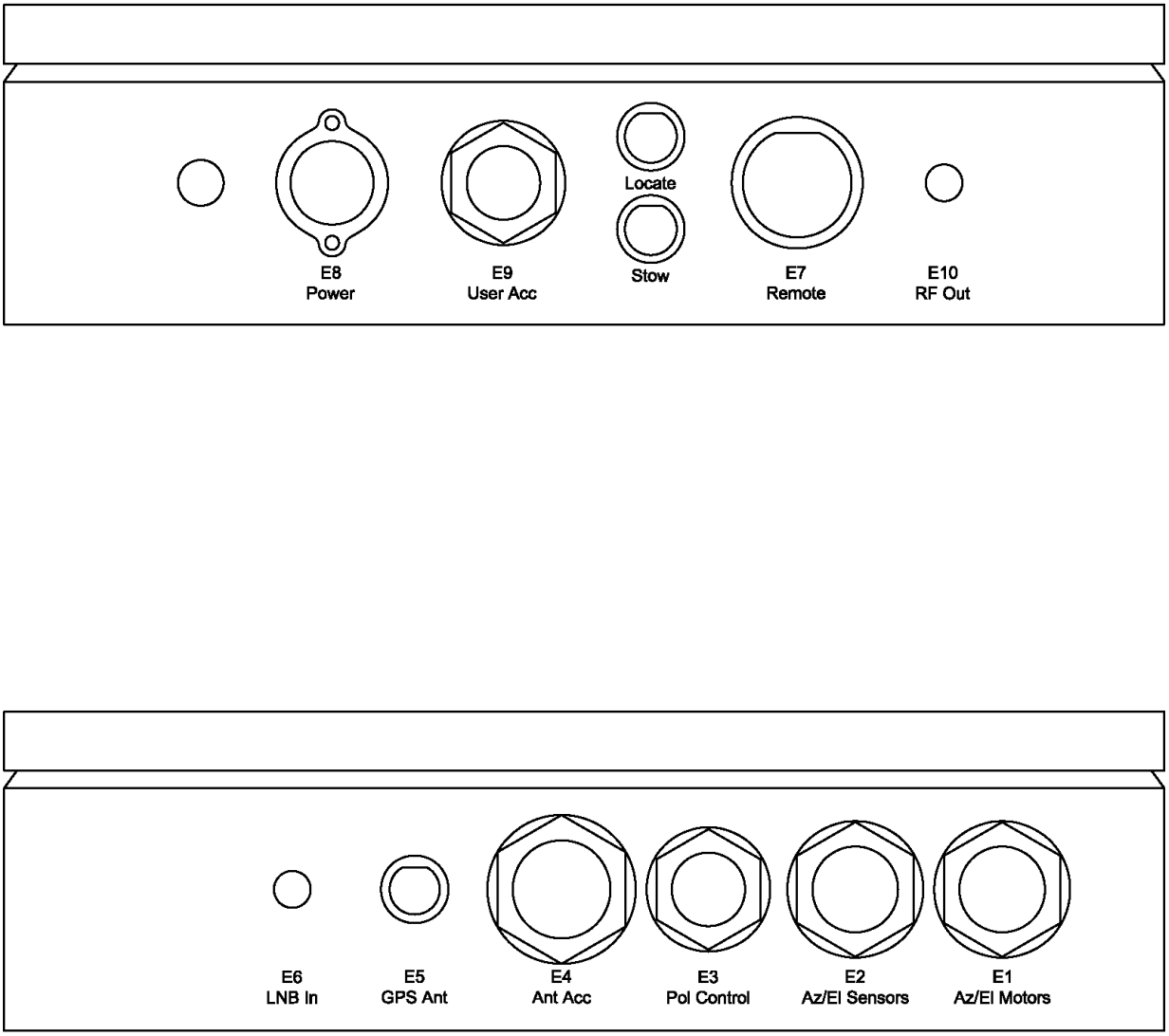


Figure 3

2.4 CONNECTORS

Table 1 provides a list of the external connectors on the enclosure end panels.

Ref Des	Part Number	Description
E1	Amphenol MS-3126E14-19P	Az/El Motors
E2	Amphenol MS-3126E14-19S	Az/El Sensors
E3	Amphenol MS-3126E12-10S	Pol Motor / Sensors
E4	Amphenol MS-3126E16-26P	Antenna Accessory
E5	Amphenol 122192	GPS In (TNC)
E6	Electronix 34-113	LNB In (F)
E7	Tyco 1738601-1	IP ** Must use environmentally sealed mating connector **
E8	Amphenol C016 20C003 100 12	AC Power In
E9	Amphenol MS-3126E12-10P	User Accessory
E10	Electronix 34-113	RF Out (F)

Table 1

3.0 ELECTRICAL

3.1.0 System Interface

Please refer to the main RC4000 User Manual to become familiar with specific capabilities and functionality of the RC4000 PCB board stack.

Figures 4 and 5 in Section 3.1.1 are provided to assist in interfacing to the RC4000. These diagrams list common equipment and how it connects to each connector on the enclosure.

Section 3.1.2 further describes the enclosure connectors and their respective pin-outs in a tabular form.

3.1.1 System Interface (Graphical)

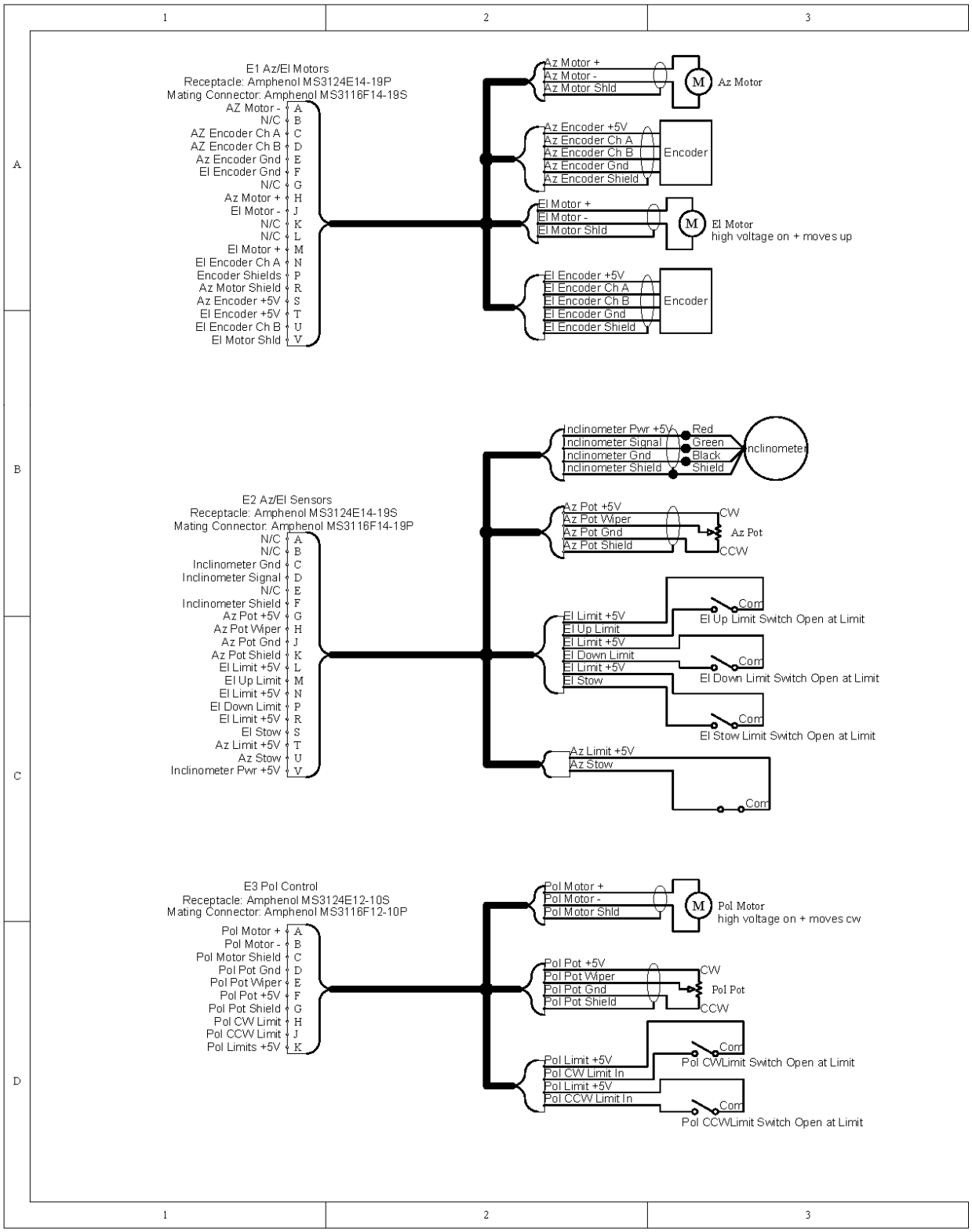


Figure 4

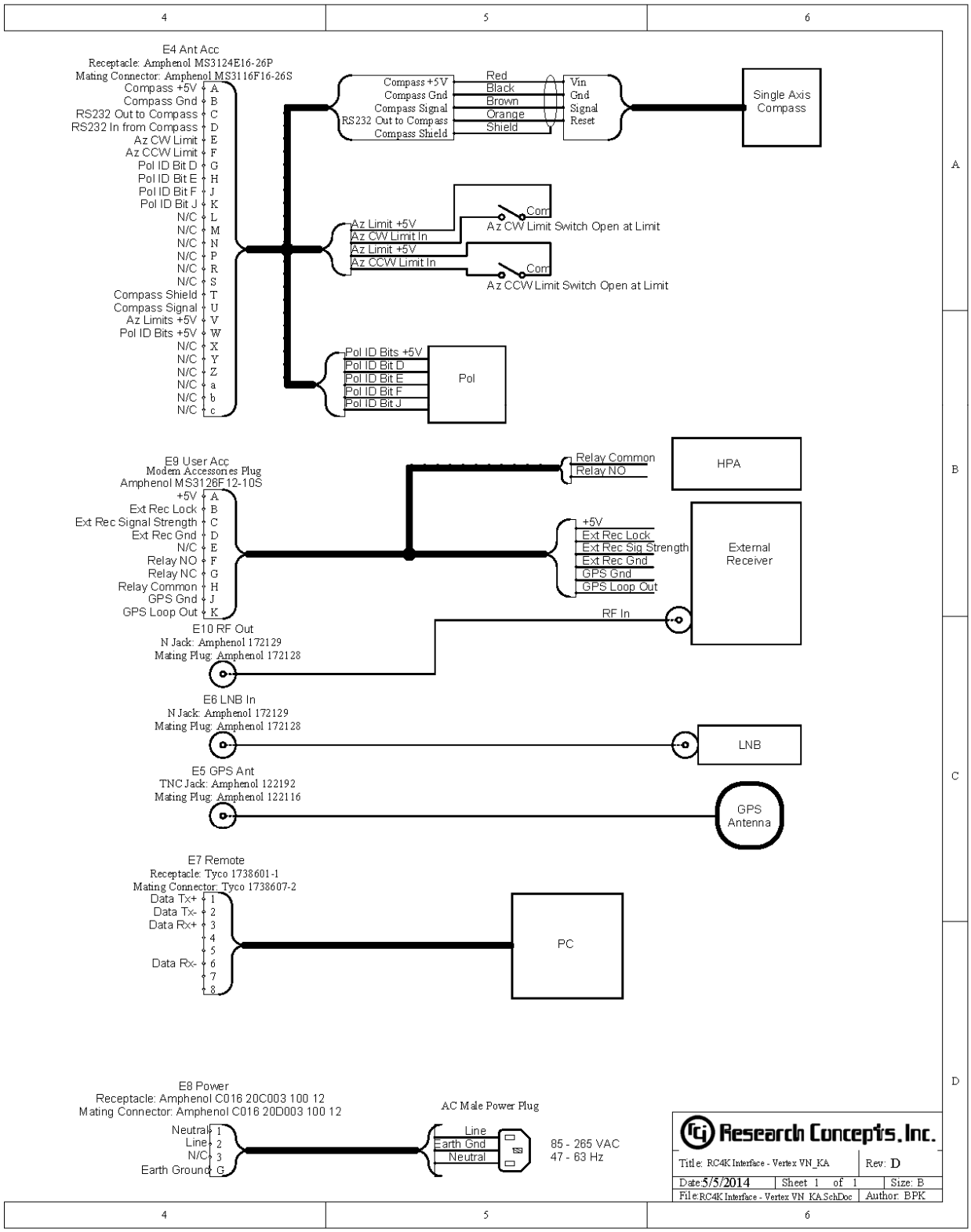
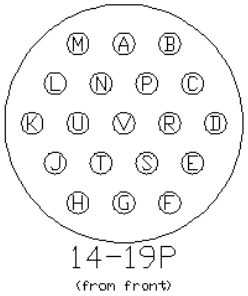

E4 Ant Acc
Receptacle: Amphenol MS3124E16-26P
Mating Connector: Amphenol MS3116F16-26S
Compass +5V A
Compass Gnd B
RS232 Out to Compass C
RS232 In from Compass D
Az CW Limit E
Az CCW Limit F
Pol ID Bit D G
Pol ID Bit E H
Pol ID Bit F J
Pol ID Bit J K
N/C L
N/C M
N/C N
N/C P
N/C R
N/C S
Compass Shield T
Compass Signal U
Az Limits +5V V
Pol ID Bits +5V W
N/C X
N/C Y
N/C Z
N/C a
N/C b
N/C c
Compass +5V
Compass Gnd
Compass Signal
RS232 Out to Compass
Compass Shield
Red
Black
Brown
Orange
Shield
Vin
Gnd
Signal
Reset
Single Axis Compass
Az Limit +5V
Az CW Limit In
Az Limit +5V
Az CCW Limit In
Com
Az CW Limit Switch Open at Limit
Com
Az CCW Limit Switch Open at Limit
Pol ID Bits +5V
Pol ID Bit D
Pol ID Bit E
Pol ID Bit F
Pol ID Bit J
Pol
E9 User Acc
Modem Accessories Plug
Amphenol MS3126F12-10S
+5V A
Ext Rec Lock B
Ext Rec Signal Strength C
Ext Rec Gnd D
N/C E
Relay NO F
Relay NC G
Relay Common H
GPS Gnd J
GPS Loop Out K
Relay Common
Relay NO
HPA
+5V
Ext Rec Lock
Ext Rec Sig Strength
Ext Rec Gnd
GPS Gnd
GPS Loop Out
External Receiver
RF In
E10 RF Out
N Jack: Amphenol 172129
Mating Plug: Amphenol 172128
E6 LNB In
N Jack: Amphenol 172129
Mating Plug: Amphenol 172128
LNB
E5 GPS Ant
TNC Jack: Amphenol 122192
Mating Plug: Amphenol 122116
GPS Antenna
E7 Remote
Receptacle: Tyco 1738601-1
Mating Connector: Tyco 1738607-2
Data Tx+ 1
Data Tx- 2
Data Rx+ 3
4
5
Data Rx- 6
7
8
PC
E8 Power
Receptacle: Amphenol C016 20C003 100 12
Mating Connector: Amphenol C016 20D003 100 12
Neutral 1
Line 2
N/C 3
Earth Ground G
AC Male Power Plug
Line
Earth Gnd
Neutral
85 - 265 VAC
47 - 63 Hz
Research Concepts, Inc.
Title: RC4K Interface - Vertex VN_KA
Rev: D
Date: 5/5/2014
Sheet 1 of 1
Size: B
File: RC4K Interface - Vertex VN_KA.SchDoc
Author: BPK

Figure 5

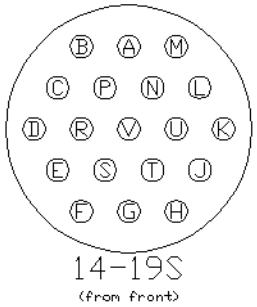
3.1.2 System Interface (Tabular)

Reference E1
Description Az/El Motors
RCI P/N CN-MS3124E14-19P
Manufacturer Amphenol Industrial
Manufacturer P/N MS3124E14-19P
Mating Connector MS3116F14-19S
RCI p/n CN-MS311614-19S
Mating Conn. Cap MS3180-14CA
RCI p/n CN-MS3180-14CA



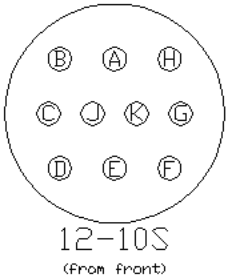
Pin	Description	Notes
A	Az Motor -	
B	N/C	
C	Az Encoder Ch A	
D	Az Encoder Ch B	
E	Az Encoder Gnd	
F	El Encoder Gnd	
G	N/C	
H	Az Motor +	
J	El Motor -	
K	N/C	
L	N/C	
M	El Motor +	
N	El Encoder Ch A	
P	Encoder Shields	
R	Az Motor Shield	
S	El Encoder +5V	
T	El Encoder +5V	
U	El Encoder Ch B	
V	El Motor Shield	

Reference	E2
Description	Az/El Sensors
RCI P/N	CN-MS3124E14-19S
Manufacturer	Amphenol Industrial
Manufacturer P/N	MS3124E14-19S
Mating Connector	MS3116F14-19P RCI p/n CN-MS311614-19P
Mating Conn. Cap	MS3180-14-CA RCI p/n CN-MS3180-14CA



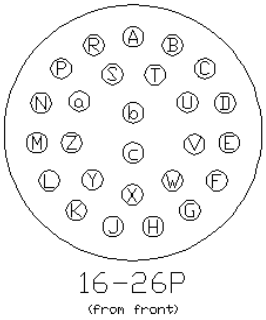
Pin	Description	Notes
A	N/C	
B	N/C	
C	Inclinometer Gnd	
D	Inclinometer Signal	
E	N/C	
F	Inclinometer Shield	
G	Az Pot +5V (CW)	
H	Az Pot Wiper	
J	Az Pot Gnd (CCW)	
K	Az Pot Shield	
L	El Up Limit +5V	
M	El Up Limit In	
N	El Down Limit +5V	
P	El Down Limit In	
R	El Stow Limit +5V	
S	El Stow Limit In	
T	Az Stow Limit +5V	
U	Az Stow Limit In	
V	Inclinometer +5V	

Reference	E3
Description	Pol Control
RCI P/N	CN-MS3124E12-10S
Manufacturer	Amphenol Industrial
Manufacturer P/N	MS3124E12-10S
Mating Connector	MS3116F12-10P RCI p/n CN-MS311612-10P
Mating Conn. Cap	MS3180-12CA RCI p/n CN-MS3180-12CA



Pin	Description	Notes
A	Pol Motor +	
B	Pol Motor -	
C	Pol Motor Shield	
D	Pol Pot Gnd (CCW)	
E	Pol Pot Wiper	
F	Pol Pot +5V (CW)	
G	Pol Pot Shield	
H	Pol CW Limit In	
J	Pol CCW Limit In	
K	Pol Limits +5V	

Reference	E4
Description	Ant Acc
RCI P/N	CN-MS3124E16-26P
Manufacturer	Amphenol Industrial
Manufacturer P/N	MS3124E16-26P
Mating Connector	MS3116F16-26S RCI p/n CN-MS311616-26S
Mating Conn. Cap	MS3180-16CA RCI p/n CN-MS3180-16CA



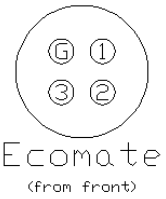
Pin	Description	Notes
A	Compass +5V	
B	Compass Gnd	
C	RS232 In from Compass	
D	RS232 Out to Compass	
E	Az CW Limit	
F	Az CCW Limit	
G	Pol ID Bit 0 (D)	
H	Pol ID Bit 1 (E)	
J	Pol ID Bit 2 (F)	
K	Pol ID Bit J	
L	N/C	
M	N/C	
N	N/C	
P	N/C	
R	N/C	
S	N/C	
T	Compass Shield	
U	Compass Signal	
V	Az Limits +5V	
W	Pol ID Bits +5V (common)	
X	N/C	
Y	N/C	
Z	N/C	
a	N/C	
b	N/C	
c	N/C	

Reference E5
Description GPS Ant, 50-Ohm TNC
RCI P/N CN-122192
Manufacturer Amphenol RF
Manufacturer P/N 122192

Reference E6
Description LNB In, 75 Ohm F-Type
RCI P/N CN-F-200-058
Manufacturer Electronix
Manufacturer P/N 34-113

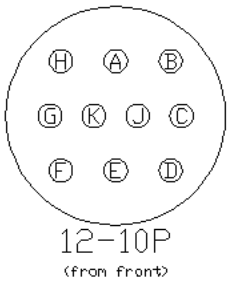
Reference E7
Description Remote
RCI P/N CN-1738601-1
Manufacturer Tyco
Manufacturer P/N 1738601-1
Mating Connector Tyco 1738607-2
RCI p/n CN-1738607-2

Reference E8
Description Power
RCI P/N CN-C016 20C00310012
Manufacturer Amphenol
Manufacturer P/N C016 20C003 100 12
Mating Connector C016 20D003 100 12
RCI p/n CN- C01620D00310012



Pin	Description	Notes
1	Neutral	
2	Line	
3	N/C	
G	Earth Gnd	

Reference E9
Description User Acc
RCI P/N CN-MS3124E12-10P
Manufacturer Amphenol Industrial
Manufacturer P/N MS3124E12-10P
Mating Connector MS3116F12-10S
RCI p/n CN-MS3116F12-10S
Mating Conn. Cap MS3180-12CA
RCI p/n CN-MS3180-12CA



Pin	Description	Notes
A	+5v	Max 150 mA
B	AGC Lock In	
C	AGC Signal In	
D	AGC Common	
E	N/C	
F	HPA Contacts NO	
G	HPA Contacts NC	
H	HPA Contacts Common	
J	GPS Gnd	
K	GPS RS232 Loopout	

Reference E10
Description LNB In, 75 Ohm F-Type
RCI P/N CN-F-200-058
Manufacturer Electronix
Manufacturer P/N 34-113

3.2 Internal Wiring

Figures 6 and 7 show the interconnections of the internal wiring of the enclosure.
For a more detailed explanation of functions of individual pins, please refer to the main RC4000 User Manual.

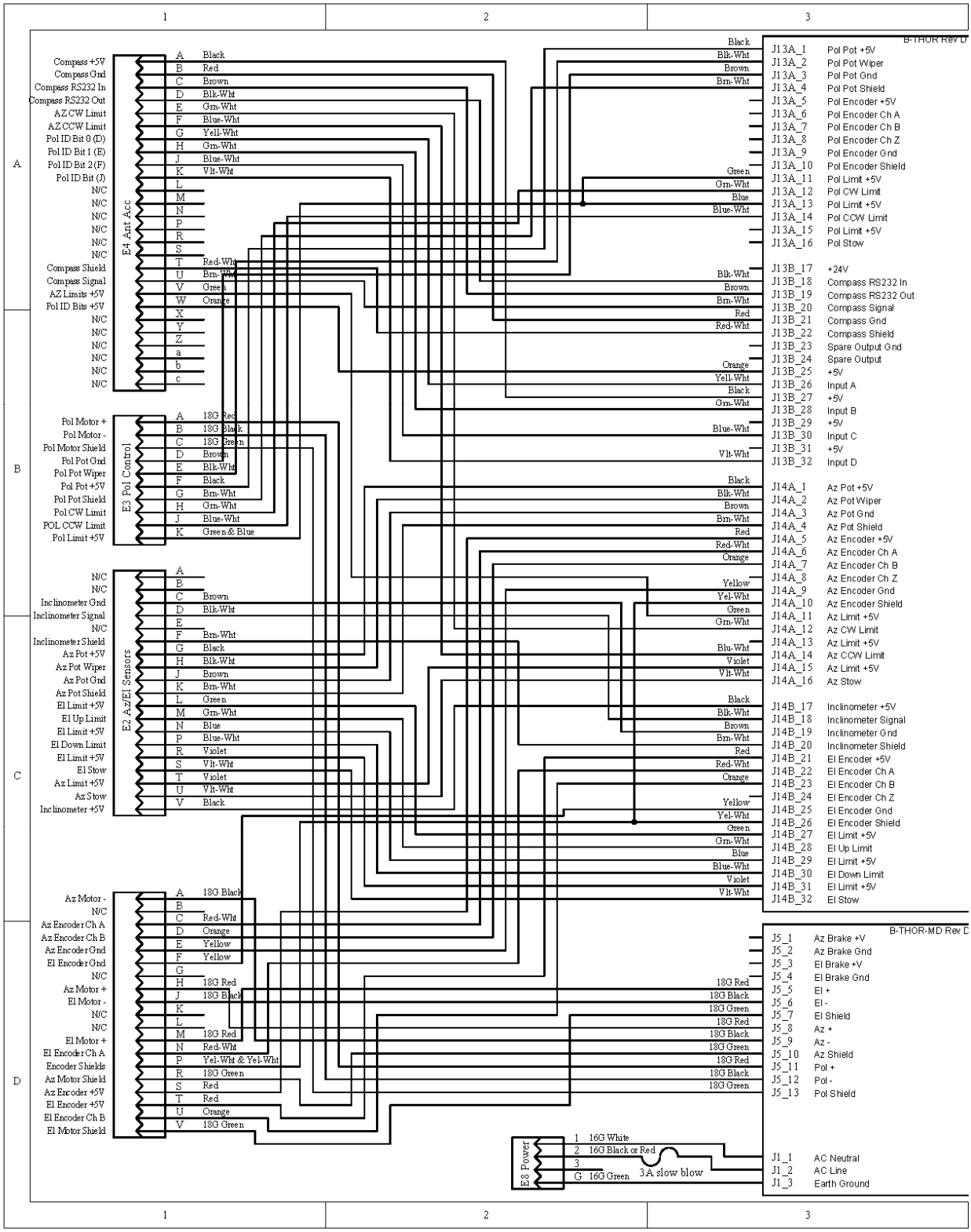

E4 Ant Acc
Compass +5V
Compass Gnd
Compass RS232 In
Compass RS232 Out
AZ CW Limit
AZ CCW Limit
Pol ID Bit 0 (D)
Pol ID Bit 1 (E)
Pol ID Bit 2 (F)
Pol ID Bit (J)
Compass Shield
Compass Signal
AZ Limits +5V
Pol ID Bits +5V
E3 Pol Control
Pol Motor +
Pol Motor -
Pol Motor Shield
Pol Pot Gnd
Pol Pot Wiper
Pol Pot +5V
Pol Pot Shield
Pol CW Limit
POL CCW Limit
Pol Limit +5V
E2 Az/El Sensors
Inclinometer Gnd
Inclinometer Signal
Inclinometer Shield
Az Pot +5V
Az Pot Wiper
Az Pot Gnd
Az Pot Shield
El Limit +5V
El Up Limit
El Down Limit
El Stow
Az Limit +5V
Az Stow
Inclinometer +5V
Az Motor -
Az Encoder Ch A
Az Encoder Ch B
Az Encoder Gnd
El Encoder Gnd
Az Motor +
El Motor -
El Motor +
El Encoder Ch A
Encoder Shields
Az Motor Shield
Az Encoder +5V
El Encoder +5V
El Encoder Ch B
El Motor Shield
B-THOR Rev D
J13A_1 Pol Pot +5V
J13A_2 Pol Pot Wiper
J13A_3 Pol Pot Gnd
J13A_4 Pol Pot Shield
J13A_5 Pol Encoder +5V
J13A_6 Pol Encoder Ch A
J13A_7 Pol Encoder Ch B
J13A_8 Pol Encoder Ch Z
J13A_9 Pol Encoder Gnd
J13A_10 Pol Encoder Shield
J13A_11 Pol Limit +5V
J13A_12 Pol CW Limit
J13A_13 Pol Limit +5V
J13A_14 Pol CCW Limit
J13A_15 Pol Limit +5V
J13A_16 Pol Stow
J13B_17 +24V
J13B_18 Compass RS232 In
J13B_19 Compass RS232 Out
J13B_20 Compass Signal
J13B_21 Compass Gnd
J13B_22 Compass Shield
J13B_23 Spare Output Gnd
J13B_24 Spare Output
J13B_25 +5V
J13B_26 Input A
J13B_27 +5V
J13B_28 Input B
J13B_29 +5V
J13B_30 Input C
J13B_31 +5V
J13B_32 Input D
J14A_1 Az Pot +5V
J14A_2 Az Pot Wiper
J14A_3 Az Pot Gnd
J14A_4 Az Pot Shield
J14A_5 Az Encoder +5V
J14A_6 Az Encoder Ch A
J14A_7 Az Encoder Ch B
J14A_8 Az Encoder Ch Z
J14A_9 Az Encoder Gnd
J14A_10 Az Encoder Shield
J14A_11 Az Limit +5V
J14A_12 Az CW Limit
J14A_13 Az Limit +5V
J14A_14 Az CCW Limit
J14A_15 Az Limit +5V
J14A_16 Az Stow
J14B_17 Inclinometer +5V
J14B_18 Inclinometer Signal
J14B_19 Inclinometer Gnd
J14B_20 Inclinometer Shield
J14B_21 El Encoder +5V
J14B_22 El Encoder Ch A
J14B_23 El Encoder Ch B
J14B_24 El Encoder Ch Z
J14B_25 El Encoder Gnd
J14B_26 El Encoder Shield
J14B_27 El Limit +5V
J14B_28 El Up Limit
J14B_29 El Limit +5V
J14B_30 El Down Limit
J14B_31 El Limit +5V
J14B_32 El Stow
B-THOR-MD Rev D
J5_1 Az Brake +V
J5_2 Az Brake Gnd
J5_3 El Brake +V
J5_4 El Brake Gnd
J5_5 El +
J5_6 El -
J5_7 El Shield
J5_8 Az +
J5_9 Az -
J5_10 Az Shield
J5_11 Pol +
J5_12 Pol -
J5_13 Pol Shield
J1_1 AC Neutral
J1_2 AC Line
J1_3 Earth Ground
E8 Power
1 16G White
2 16G Black or Red
3
G 16G Green
3A slow blow

Figure 6

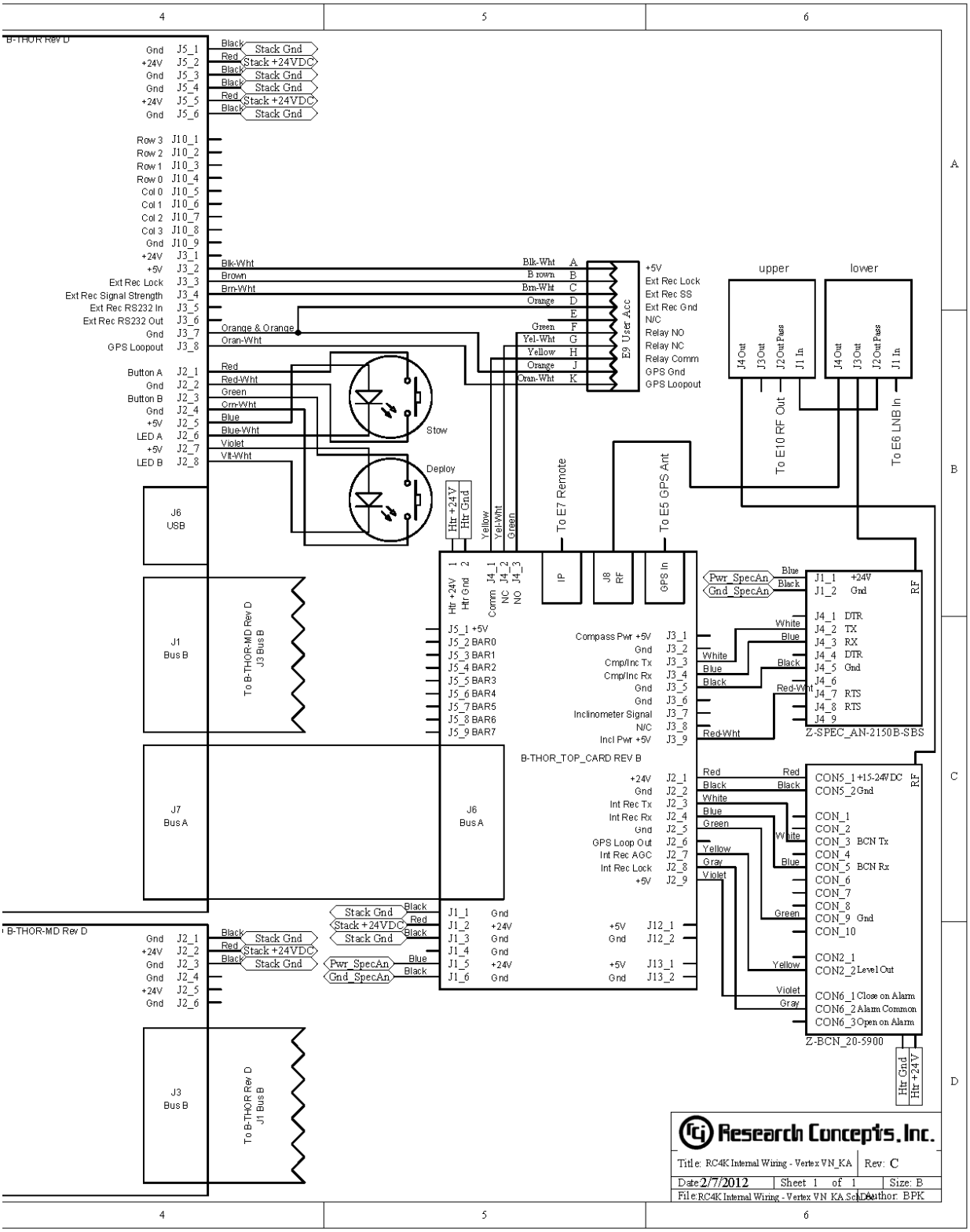

B-THOR Rev D
Gnd J5_1
+24V J5_2
Gnd J5_3
Gnd J5_4
+24V J5_5
Gnd J5_6
Black Stack Gnd
Red Stack +24VDC
Black Stack Gnd
Black Stack Gnd
Red Stack +24VDC
Black Stack Gnd
Row 3 J10_1
Row 2 J10_2
Row 1 J10_3
Row 0 J10_4
Col 0 J10_5
Col 1 J10_6
Col 2 J10_7
Col 3 J10_8
Gnd J10_9
+24V J3_1
+5V J3_2
Ext Rec Lock J3_3
Ext Rec Signal Strength J3_4
Ext Rec RS232 In J3_5
Ext Rec RS232 Out J3_6
Gnd J3_7
GPS Loopout J3_8
Button A J2_1
Gnd J2_2
Button B J2_3
Gnd J2_4
+5V J2_5
LED A J2_6
+5V J2_7
LED B J2_8
Blk-Wht
Brown
Brn-Wht
Orange & Orange
Oran-Wht
Red
Red-Wht
Green
Grn-Wht
Blue
Blue-Wht
Violet
Vlt-Wht
Stow
Deploy
Blk-Wht A
Brown B
Brn-Wht C
Orange D
E
Green F
Yel-Wht G
Yellow H
Orange J
Oran-Wht K
E9 User Acc
+5V
Ext Rec Lock
Ext Rec SS
Ext Rec Gnd
N/C
Relay NO
Relay NC
Relay Comm
GPS Gnd
GPS Loopout
upper
lower
J4 Out
J3 Out
J2 Out Pass
J1 In
To E10 RF Out
To E6 LNB In
To E7 Remote
To E5 GPS Ant
Htr +24V
Htr Gnd
Yellow
Yel-Wht
Green
J6
USB
J1
Bus B
To B-THOR-MD Rev D
J3 Bus B
J7
Bus A
J6
Bus A
IP
J8
RF
GPS In
Htr +24V 1
Htr Gnd 2
Comm J4_1
NC J4_2
NO J4_3
J5_1 +5V
J5_2 BAR0
J5_3 BAR1
J5_4 BAR2
J5_5 BAR3
J5_6 BAR4
J5_7 BAR5
J5_8 BAR6
J5_9 BAR7
Compass Pwr +5V J3_1
Gnd J3_2
Cmp/Inc Tx J3_3
Cmp/Inc Rx J3_4
Gnd J3_5
Gnd J3_6
Inclinometer Signal J3_7
N/C J3_8
Incl Pwr +5V J3_9
B-THOR_TOP_CARD REV B
+24V J2_1
Gnd J2_2
Int Rec Tx J2_3
Int Rec Rx J2_4
Gnd J2_5
GPS Loop Out J2_6
Int Rec AGC J2_7
Int Rec Lock J2_8
+5V J2_9
+5V J12_1
Gnd J12_2
+5V J13_1
Gnd J13_2
Pwr_SpecAn Blue
Gnd_SpecAn Black
J1_1 +24V
J1_2 Gnd
J4_1 DTR
J4_2 TX
J4_3 RX
J4_4 DTR
J4_5 Gnd
J4_6
J4_7 RTS
J4_8 RTS
J4_9
Z-SPEC_AN-2150B-SBS
CON5_1 +15-24VDC
CON5_2 Gnd
CON_1
CON_2
CON_3 BCN Tx
CON_4
CON_5 BCN Rx
CON_6
CON_7
CON_8
CON_9 Gnd
CON_10
CON2_1
CON2_2 Level Out
CON6_1 Close on Alarm
CON6_2 Alarm Common
CON6_3 Open on Alarm
Z-BCN_20-5900
B-THOR-MD Rev D
J2
J3
Bus B
To B-THOR Rev D
J1 Bus B
J1_1 Gnd
J1_2 +24V
J1_3 Gnd
J1_4 Gnd
J1_5 +24V
J1_6 Gnd
Research Concepts, Inc.
Title: RC4K Internal Wiring - Vertex VN_KA
Rev: C
Date: 2/7/2012
Sheet 1 of 1
Size: B
File: RC4K Internal Wiring - Vertex VN_KA.SchDoc
Author: BPK

Figure 7