Wiring Diagram for 32' Marinette Flybridge Sedan with conversion to twin Perkins diesels

I have made every attempt to ensure that these drawings are accurate but there is no guarantee that the drawings are correct or that they are suitable for any purpose.

This wiring represents my current view of how my boat should be wired, based on my experience in aerospace and naval engineering. This is a work in progress and I would be happy for comments from anyone.

Doug Rose

dougrose@ureach.com

Conventions:

Line widths reflect the size of the wire used in the circuit. The key is shown on the 'Primary' drawing.

All wires are shown going to the physical terminal to which they are actually wired, so the boat “looks” like the diagram.

Connections to other drawings may be shown for clarity, as called out on the print. Those portions of a drawing already shown elsewhere are dotted. The actual circuit appears only once in solid.

Philosophy:

The wire network consists of cables (of several wires each) that connect terminal blocks located at each important station, and shorter wires from the terminal blocks to individual loads. Installation effort is reduced when each cable is pulled as a unit.

Terminal blocks have the same configuration as the accessory (eyebrow) panel breakers for clarity. Troubleshooting and repair are easier when the terminal block function assignments are the same at each station. This means that some terminals will be unused.

The wiring for each engine is separate from and not connected to the other, and the engine circuits are separate from the ship's circuits. This increases reliability, isolates failures, and speeds troubleshooting. The only connection common among the three independent systems is the ground plate.

Similarly, the 'port' accessories, those with breakers on the port half of the accessory panel, are a separate circuit from the 'starboard' accessories. The two circuits are common only at the 'ship's power' terminals.

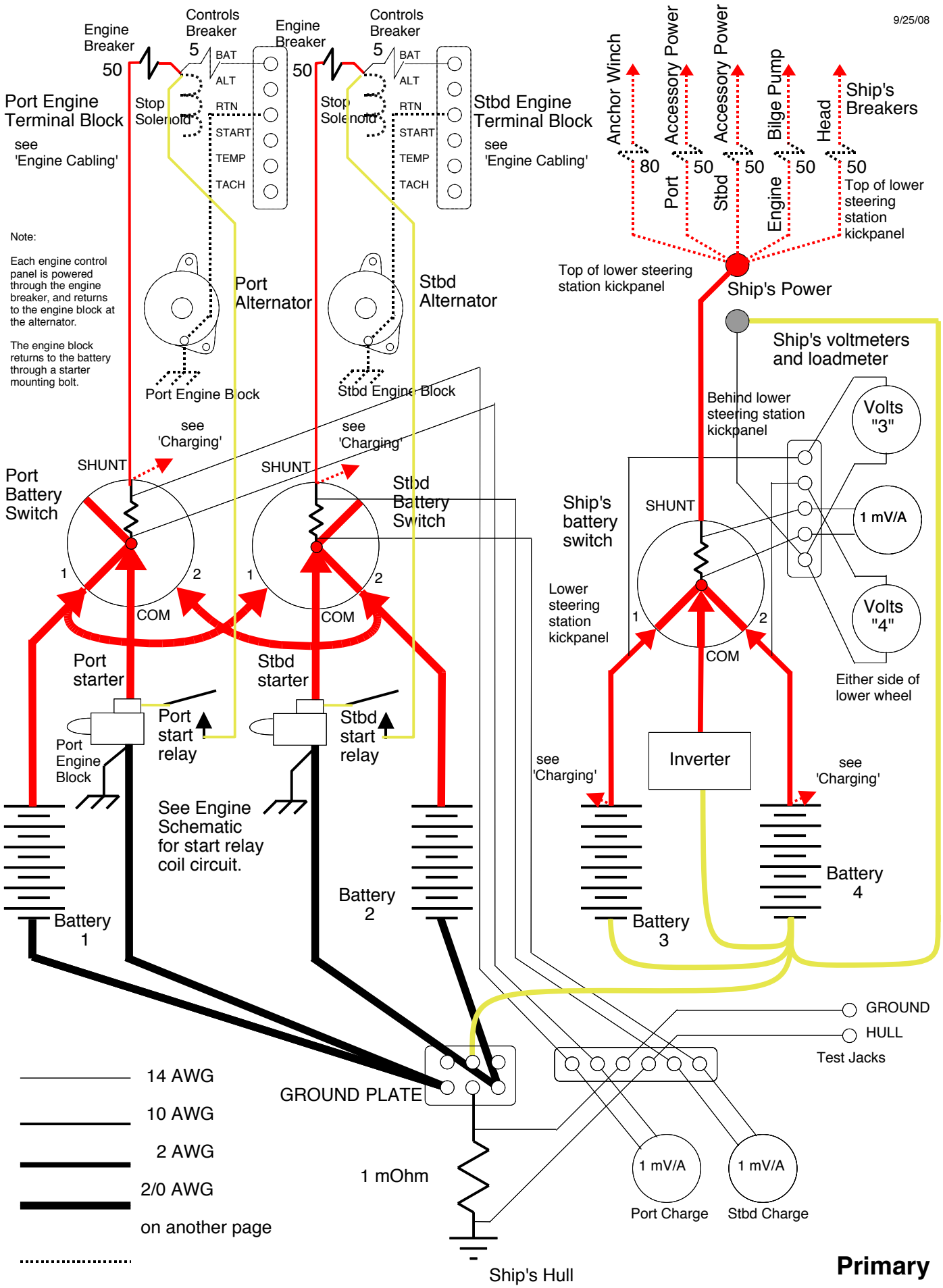
The exception to the engine circuit separation is the provision for starting either engine from either battery, as shown in 'Primary'. When the switches are in normal position as shown in 'Primary', the engine circuits are separate.

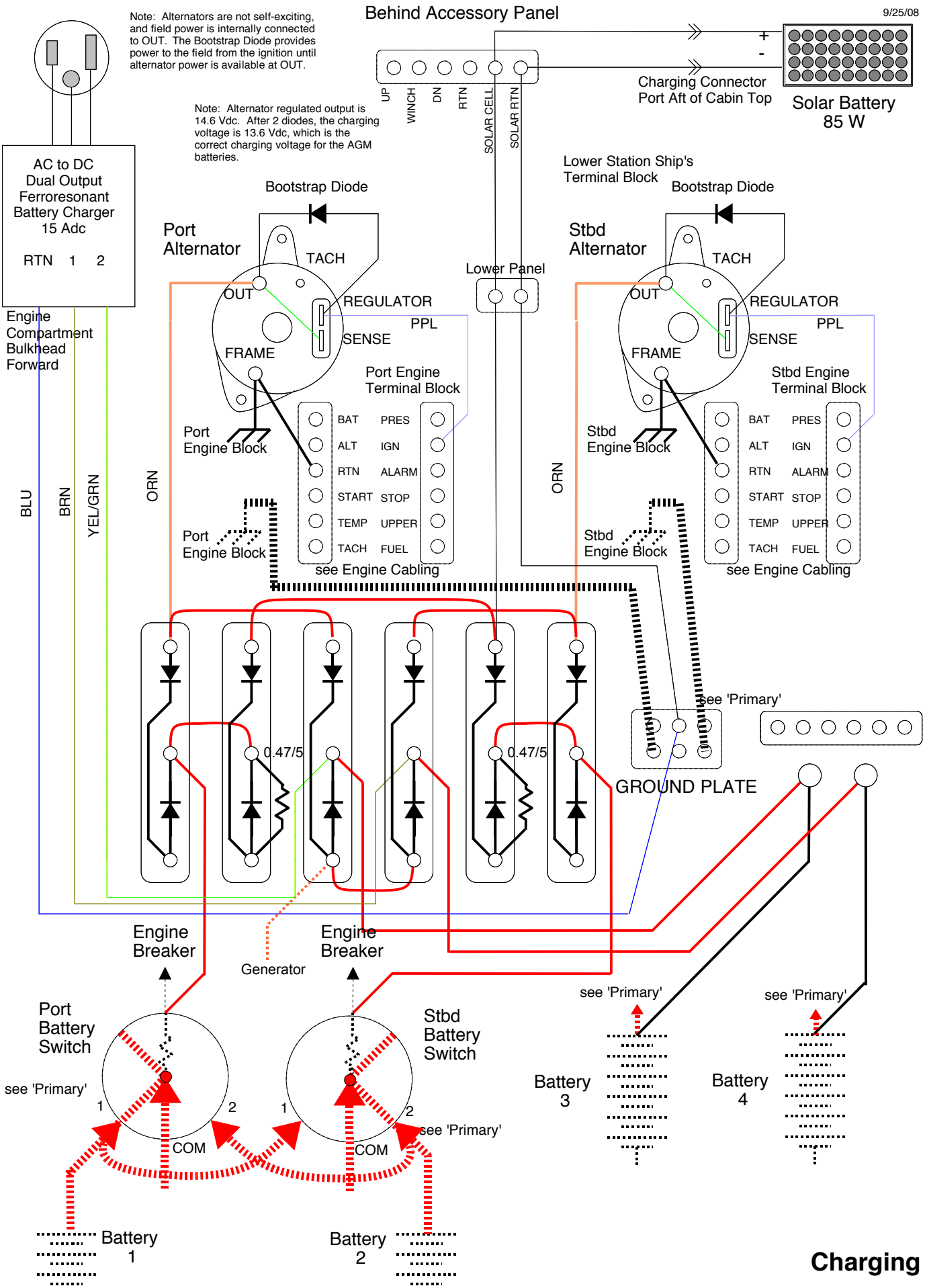
Every attempt has been made to avoid “daisy chaining”, the practice of running power or ground from load to load. Rather, loads are each wired to common terminals. This avoids the “Christmas tree effect” when troubleshooting.

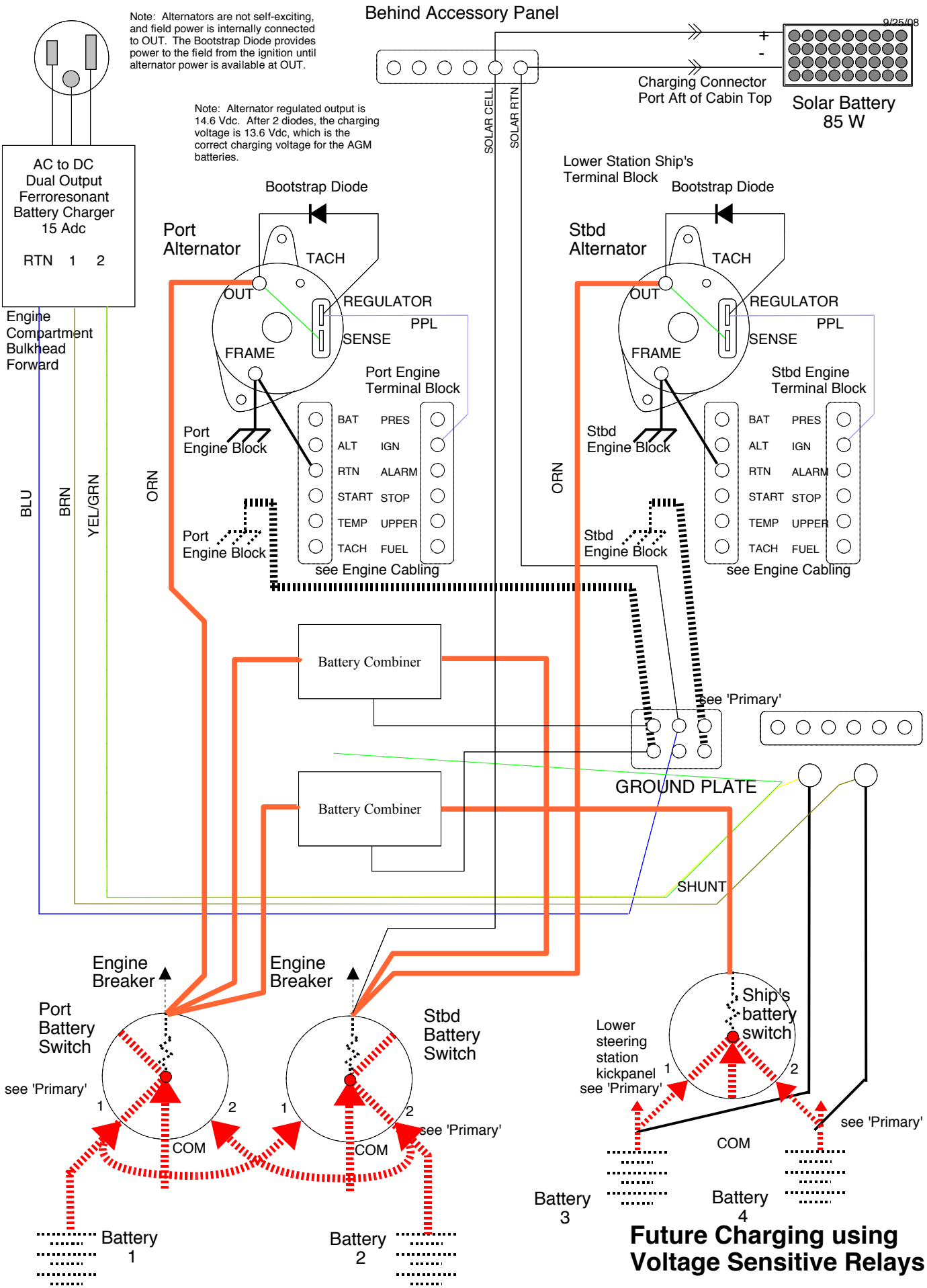
Returns are provided for each load, and for each circuit. Each ground/return wire parallels its companion positive wire throughout until the current returns to the ground plate. Nothing is grounded directly to the hull. All returns end at the ground plate, which is connected to the hull through a 1 milliohm shunt, used for troubleshooting.

Notes:

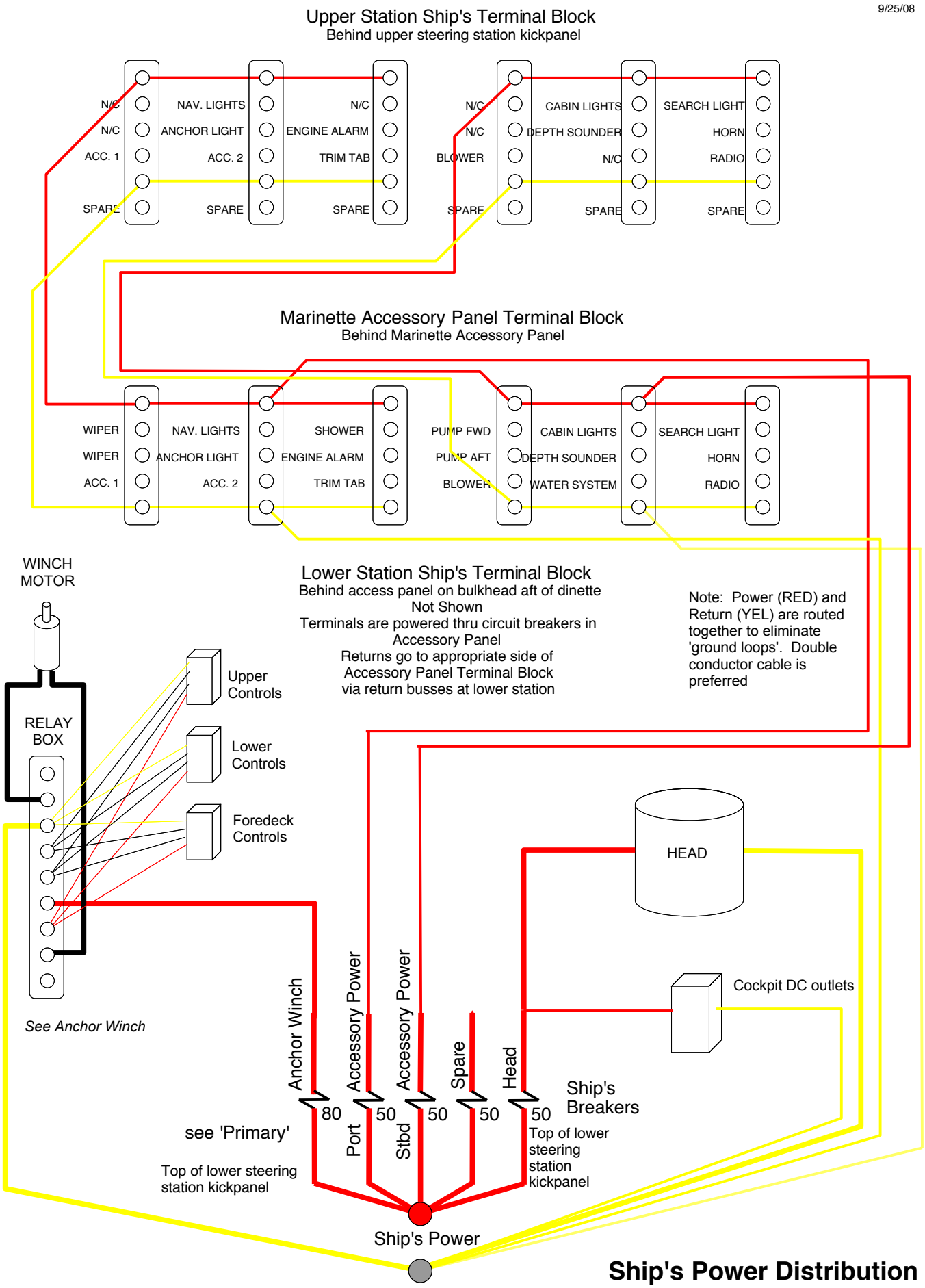
A number of suppliers offer voltage-sensitive automatic charging relays that short batteries together when either one sees charging voltage. These would make a good substitute for the diode bank shown in 'Charging'.


9/25/08
Engine Breaker
50
Controls Breaker
5
BAT
ALT
RTN
START
TEMP
TACH
Port Engine Terminal Block
see 'Engine Cabling'
Stop Solenoid
Stbd Engine Terminal Block
see 'Engine Cabling'
Anchor Winch
Accessory Power
Accessory Power
Bilge Pump
Head
Ship's Breakers
80
50
50
50
50
Port
Stbd
Engine
Top of lower steering station kickpanel
Note:
Each engine control panel is powered through the engine breaker, and returns to the engine block at the alternator.
The engine block returns to the battery through a starter mounting bolt.
Port Alternator
Stbd Alternator
Port Engine Block
Stbd Engine Block
Top of lower steering station kickpanel
Ship's Power
Ship's voltmeters and loadmeter
Behind lower steering station kickpanel
Volts "3"
1 mV/A
Volts "4"
Either side of lower wheel
see 'Charging'
SHUNT
Port Battery Switch
Stbd Battery Switch
Ship's battery switch
Lower steering station kickpanel
COM
Port starter
Stbd starter
Port start relay
Stbd start relay
Port Engine Block
See Engine Schematic for start relay coil circuit.
Inverter
Battery 1
Battery 2
Battery 3
Battery 4
GROUND
HULL
Test Jacks
GROUND PLATE
1 mOhm
1 mV/A
Port Charge
Stbd Charge
Ship's Hull
14 AWG
10 AWG
2 AWG
2/0 AWG
on another page
Primary


9/25/08
Note: Alternators are not self-exciting, and field power is internally connected to OUT. The Bootstrap Diode provides power to the field from the ignition until alternator power is available at OUT.
Behind Accessory Panel
UP
WINCH
DN
RTN
SOLAR CELL
SOLAR RTN
+
-
Charging Connector
Port Aft of Cabin Top
Solar Battery
85 W
Note: Alternator regulated output is 14.6 Vdc. After 2 diodes, the charging voltage is 13.6 Vdc, which is the correct charging voltage for the AGM batteries.
AC to DC
Dual Output
Ferroresonant
Battery Charger
15 Adc
RTN 1 2
Engine
Compartment
Bulkhead
Forward
Bootstrap Diode
Port
Alternator
TACH
OUT
REGULATOR
PPL
SENSE
FRAME
Lower Panel
Lower Station Ship's
Terminal Block
Bootstrap Diode
Stbd
Alternator
TACH
OUT
REGULATOR
PPL
SENSE
FRAME
Port Engine
Terminal Block
Port
Engine Block
BAT PRES
ALT IGN
RTN ALARM
START STOP
TEMP UPPER
TACH FUEL
see Engine Cabling
Stbd Engine
Terminal Block
Stbd
Engine Block
BAT PRES
ALT IGN
RTN ALARM
START STOP
TEMP UPPER
TACH FUEL
see Engine Cabling
BLU
BRN
YEL/GRN
ORN
ORN
Port
Engine Block
Stbd
Engine Block
0.47/5
0.47/5
see 'Primary'
GROUND PLATE
Engine
Breaker
Generator
Engine
Breaker
see 'Primary'
see 'Primary'
Port
Battery
Switch
see 'Primary'
Stbd
Battery
Switch
Battery
3
Battery
4
1
2
COM
1
2
COM
see 'Primary'
Battery
1
Battery
2
Charging

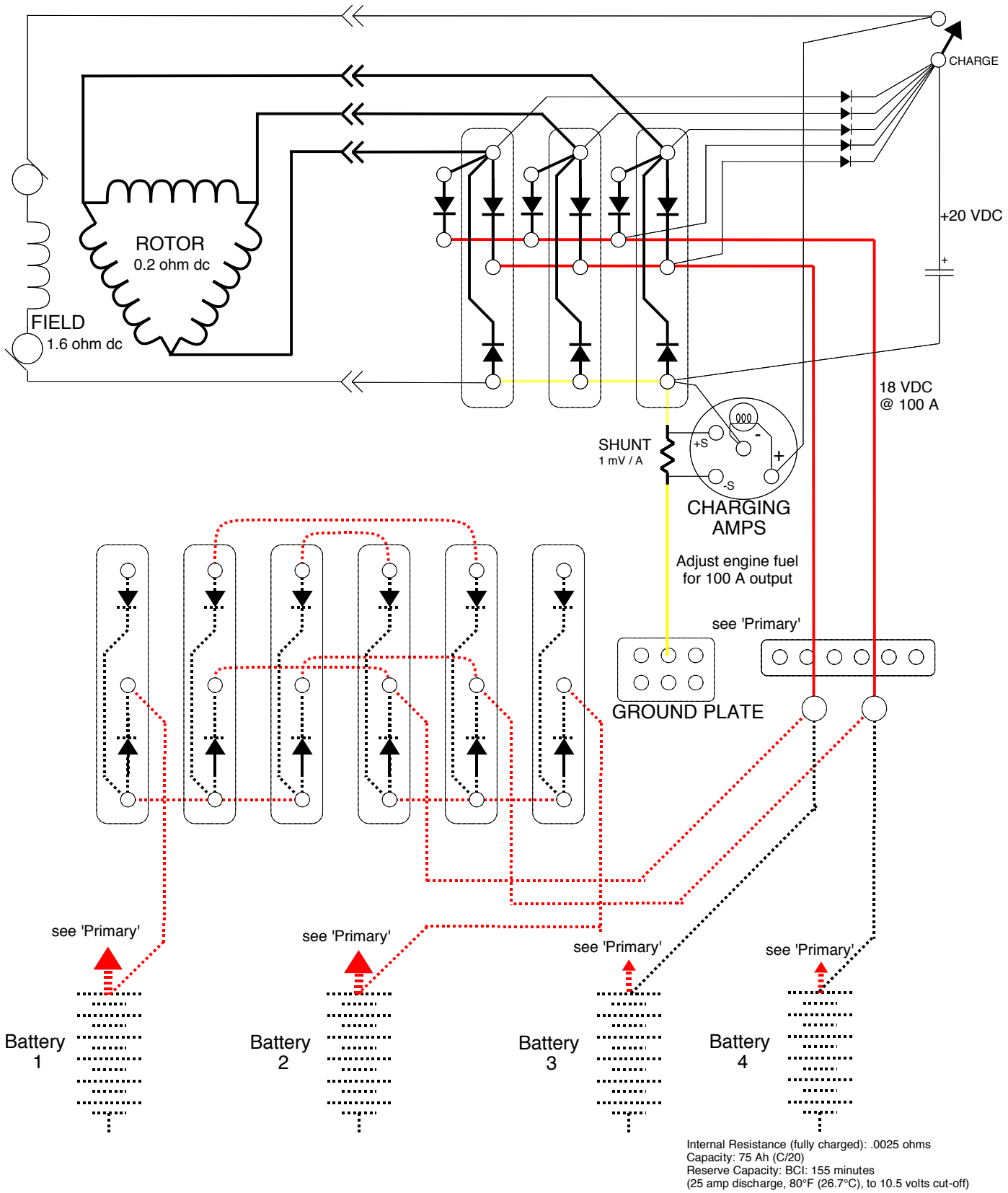

9/25/08
Note: Alternators are not self-exciting, and field power is internally connected to OUT. The Bootstrap Diode provides power to the field from the ignition until alternator power is available at OUT.
Behind Accessory Panel
Note: Alternator regulated output is 14.6 Vdc. After 2 diodes, the charging voltage is 13.6 Vdc, which is the correct charging voltage for the AGM batteries.
SOLAR CELL
SOLAR RTN
+
-
Charging Connector
Port Aft of Cabin Top
Solar Battery
85 W
AC to DC
Dual Output
Ferroresonant
Battery Charger
15 Adc
RTN 1 2
Engine
Compartment
Bulkhead
Forward
Lower Station Ship's
Terminal Block
Bootstrap Diode
Port
Alternator
TACH
OUT
REGULATOR
PPL
SENSE
FRAME
Port Engine
Terminal Block
Port
Engine Block
BAT PRES
ALT IGN
RTN ALARM
START STOP
TEMP UPPER
TACH FUEL
Port
Engine Block
see Engine Cabling
Bootstrap Diode
Stbd
Alternator
TACH
OUT
REGULATOR
PPL
SENSE
FRAME
Stbd Engine
Terminal Block
Stbd
Engine Block
BAT PRES
ALT IGN
RTN ALARM
START STOP
TEMP UPPER
TACH FUEL
Stbd
Engine Block
see Engine Cabling
BLU
BRN
YEL/GRN
ORN
ORN
Battery Combiner
Battery Combiner
see 'Primary'
GROUND PLATE
SHUNT
Engine
Breaker
Engine
Breaker
Port
Battery
Switch
Stbd
Battery
Switch
see 'Primary'
1
2
COM
1
2
COM
see 'Primary'
Lower
steering
station
kickpanel
see 'Primary'
Ship's
battery
switch
1
2
COM
see 'Primary'
Battery
1
Battery
2
Battery
3
Battery
4
Future Charging using
Voltage Sensitive Relays

9/25/08


Upper Station Ship's Terminal Block
Behind upper steering station kickpanel
N/C
N/C
ACC. 1
SPARE
NAV. LIGHTS
ANCHOR LIGHT
ACC. 2
SPARE
N/C
ENGINE ALARM
TRIM TAB
SPARE
N/C
N/C
BLOWER
SPARE
CABIN LIGHTS
DEPTH SOUNDER
N/C
SPARE
SEARCH LIGHT
HORN
RADIO
SPARE
Marinette Accessory Panel Terminal Block
Behind Marinette Accessory Panel
WIPER
WIPER
ACC. 1
NAV. LIGHTS
ANCHOR LIGHT
ACC. 2
SHOWER
ENGINE ALARM
TRIM TAB
PUMP FWD
PUMP AFT
BLOWER
CABIN LIGHTS
DEPTH SOUNDER
WATER SYSTEM
SEARCH LIGHT
HORN
RADIO
WINCH MOTOR
Lower Station Ship's Terminal Block
Behind access panel on bulkhead aft of dinette
Not Shown
Terminals are powered thru circuit breakers in Accessory Panel
Returns go to appropriate side of Accessory Panel Terminal Block via return busses at lower station
Note: Power (RED) and Return (YEL) are routed together to eliminate 'ground loops'. Double conductor cable is preferred
RELAY BOX
Upper Controls
Lower Controls
Foredeck Controls
See Anchor Winch
HEAD
Cockpit DC outlets
Anchor Winch
Accessory Power
Accessory Power
Spare
Head
80
50
50
50
50
Port
Stbd
Ship's Breakers
see 'Primary'
Top of lower steering station kickpanel
Top of lower steering station kickpanel
Ship's Power
Ship's Power Distribution

CONTROL CIRCUIT: => Starts engine when V3 or V4 drops to 11.5 Vdc
=> Stops engine when V3 or V4 reaches 14.7 Vdc
=> Stops engine if no oil pressure for 15 seconds
=> Stops engine on engine over temperature
=> Stops engine on battery over temperature

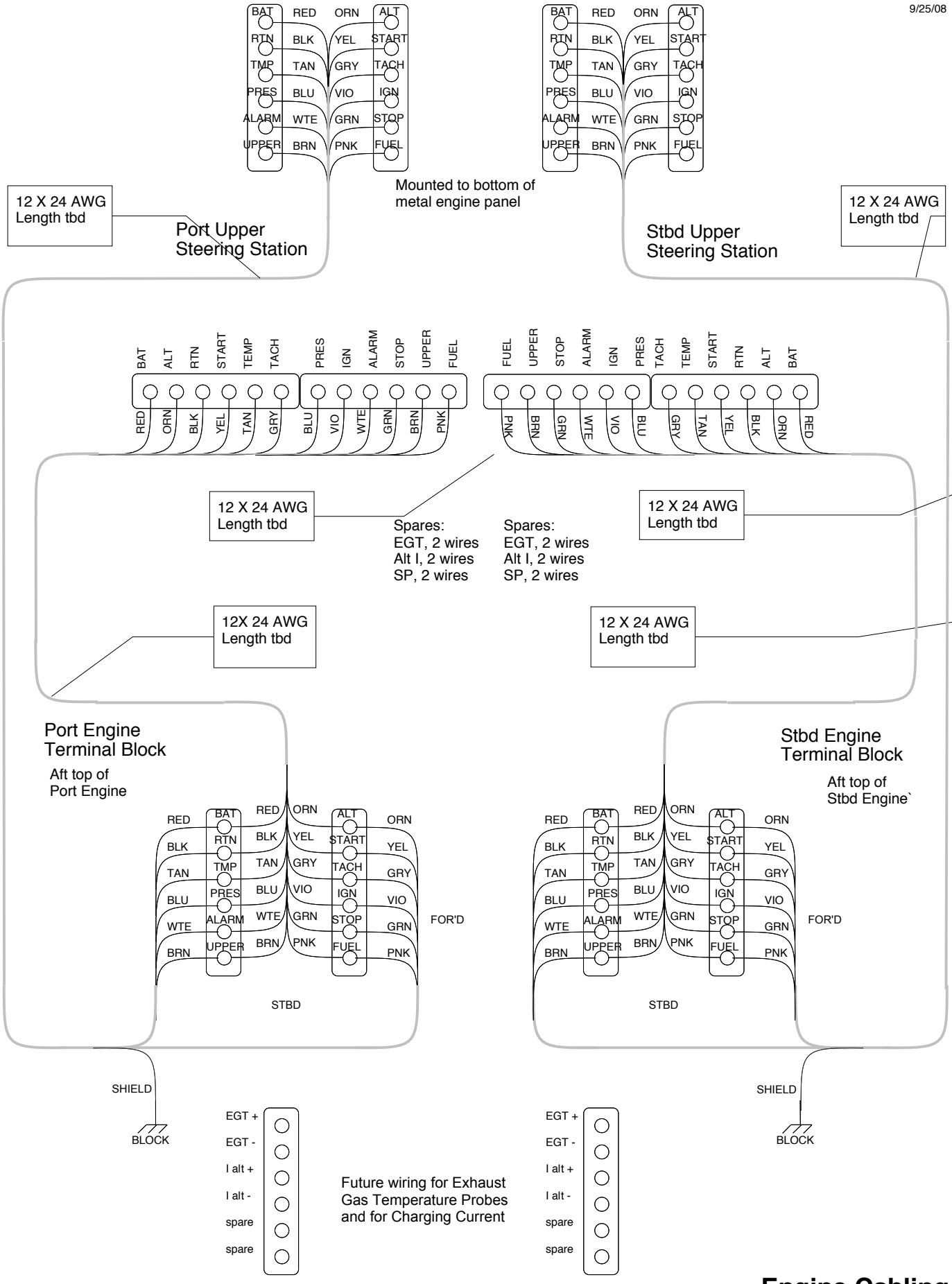
There is no current control. The engine fuel lever is adjusted manually to obtain 100 A. of charge, and is then mechanically locked.



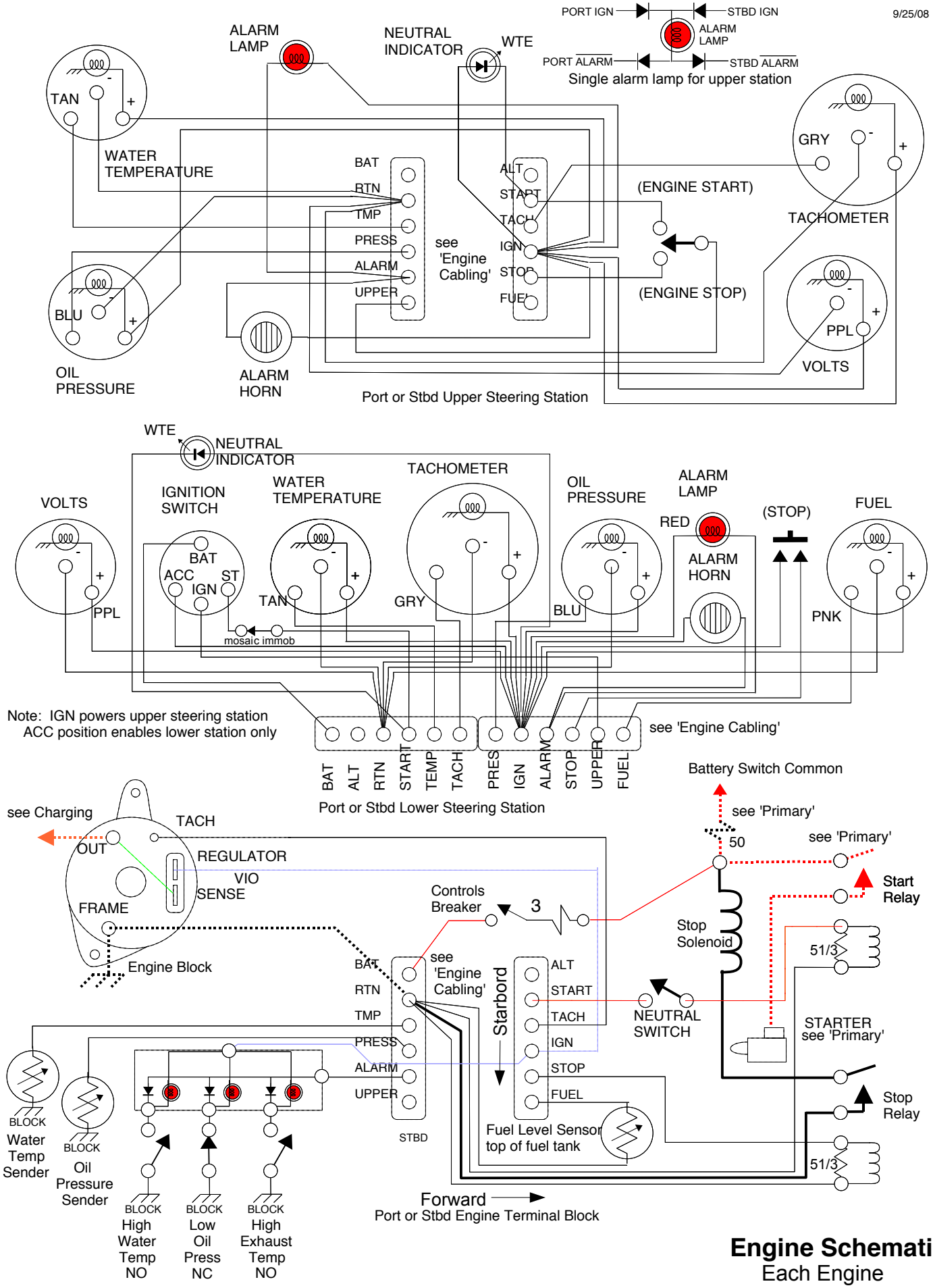
Internal Resistance (fully charged): .0025 ohms
Capacity: 75 Ah (C/20)
Reserve Capacity: BCI: 155 minutes
(25 amp discharge, 80°F (26.7°C), to 10.5 volts cut-off)

Generator

9/25/08



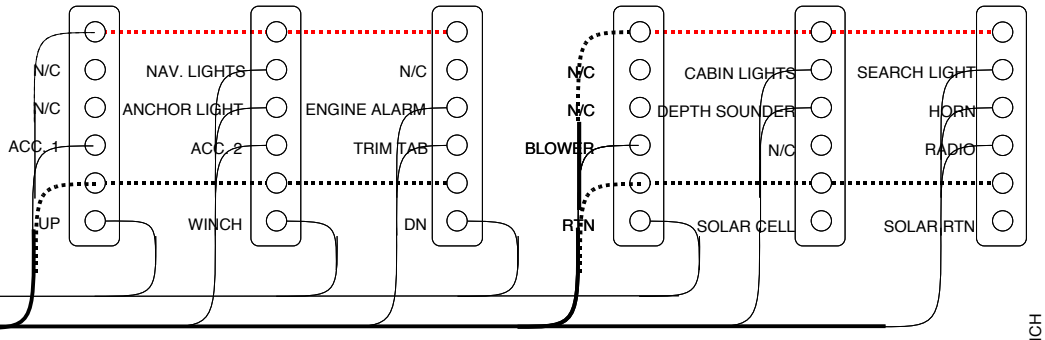
Engine Cabling



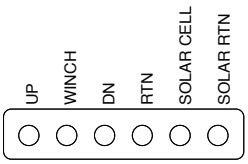
Engine Schematic

Each Engine

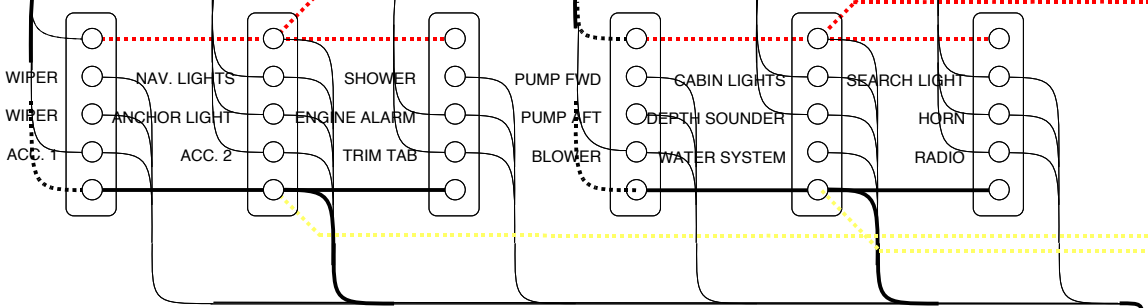
Upper Station Ship's Terminal Block
Behind upper steering station kickpanel



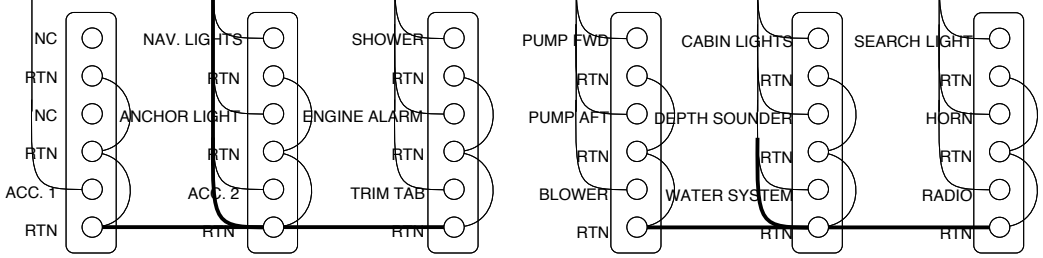
See Anchor Winch



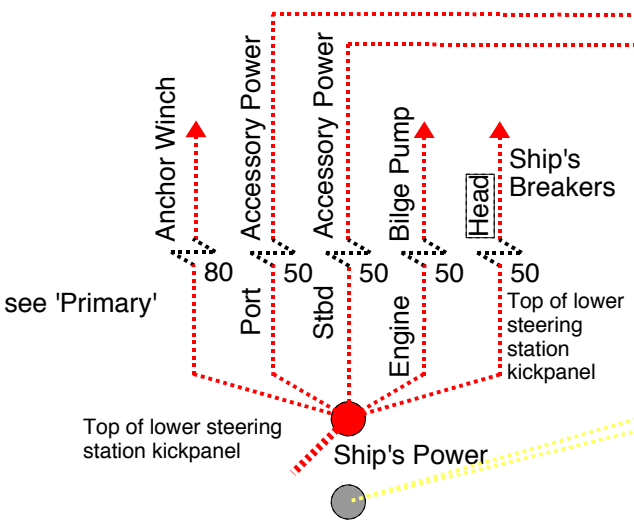
Marinette Accessory Panel Terminal Block
Behind Marinette Accessory Panel



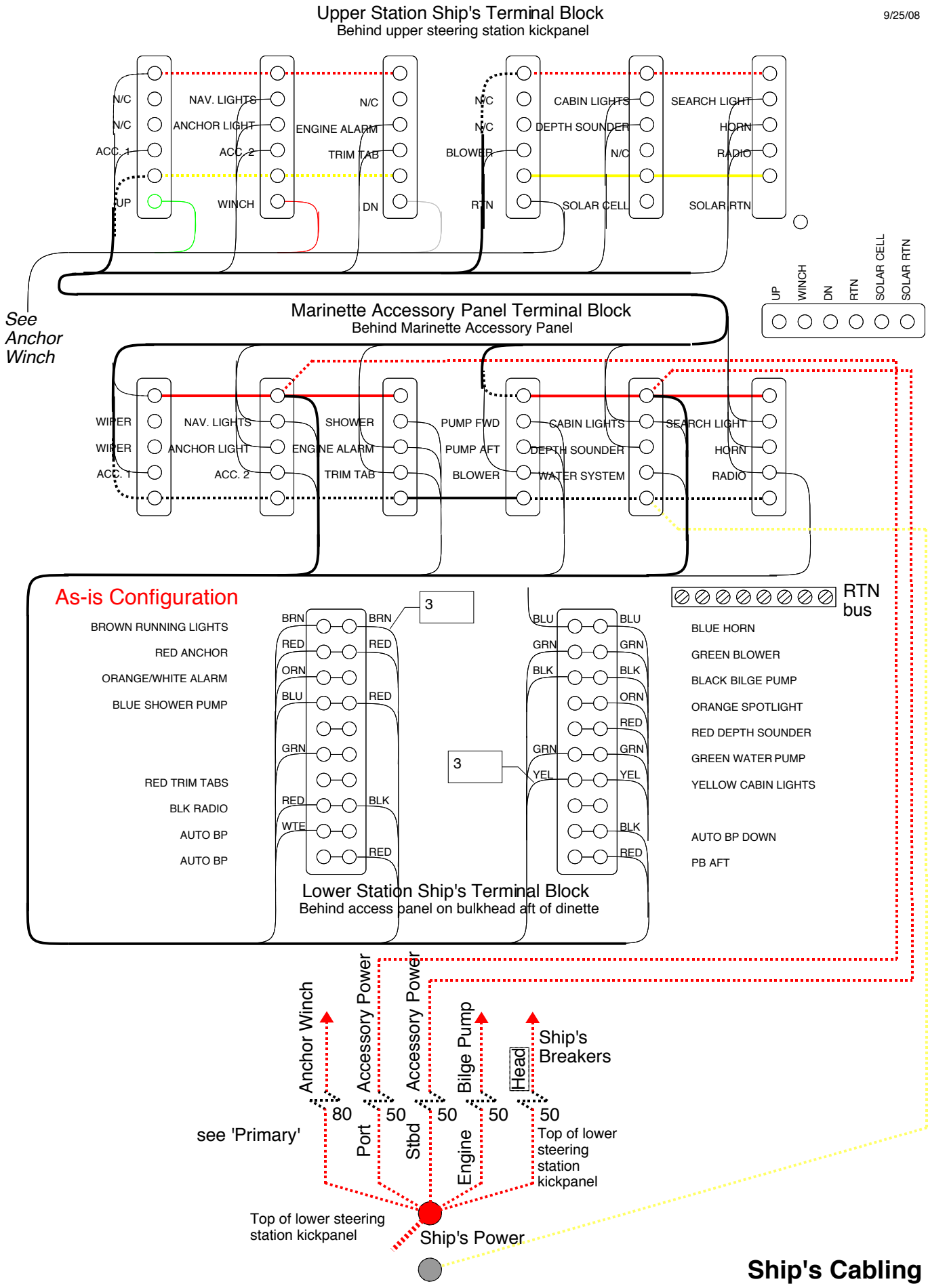
FUTURE CONFIGURATION

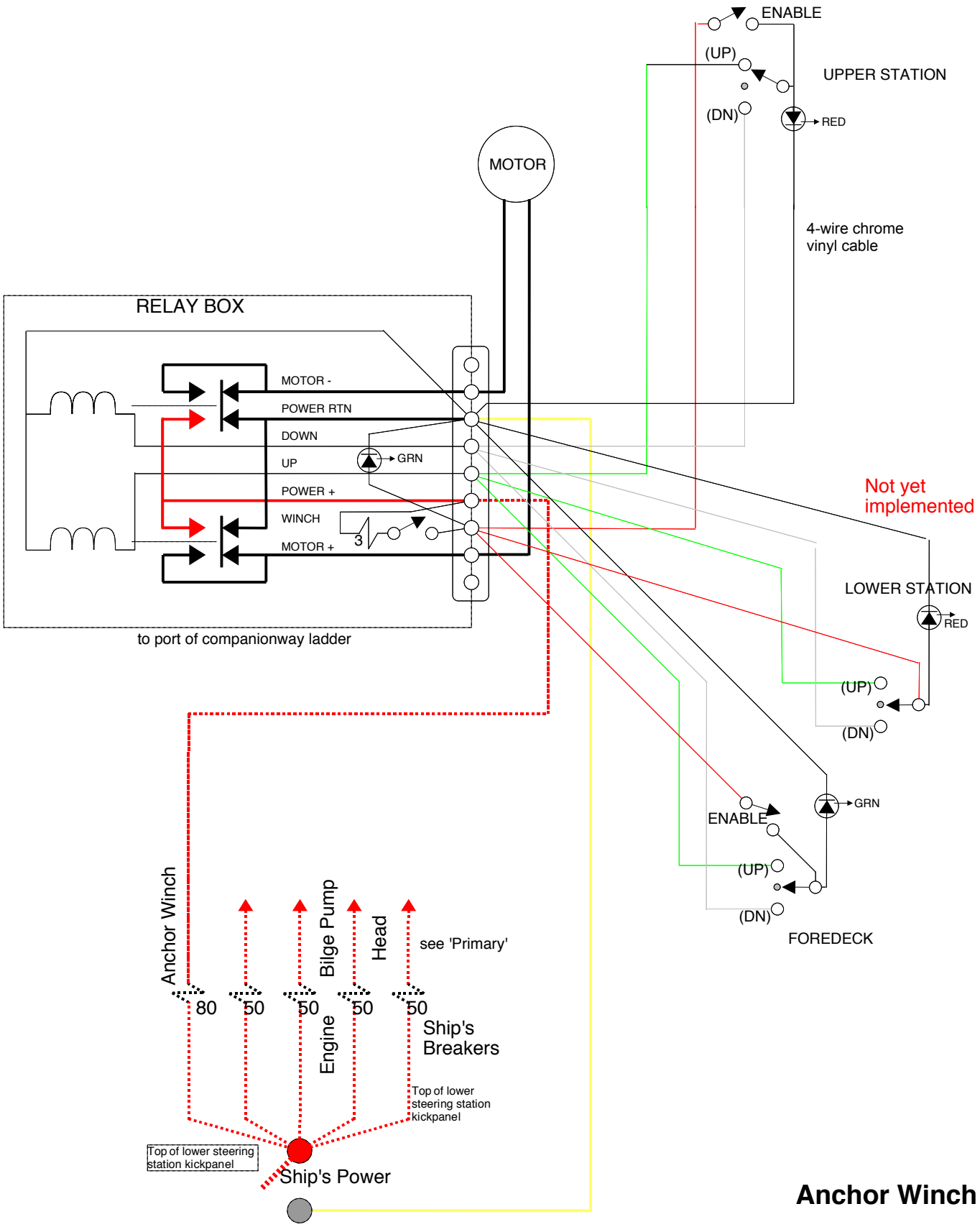


Lower Station Ship's Terminal Block
Behind access panel on bulkhead aft of dinette

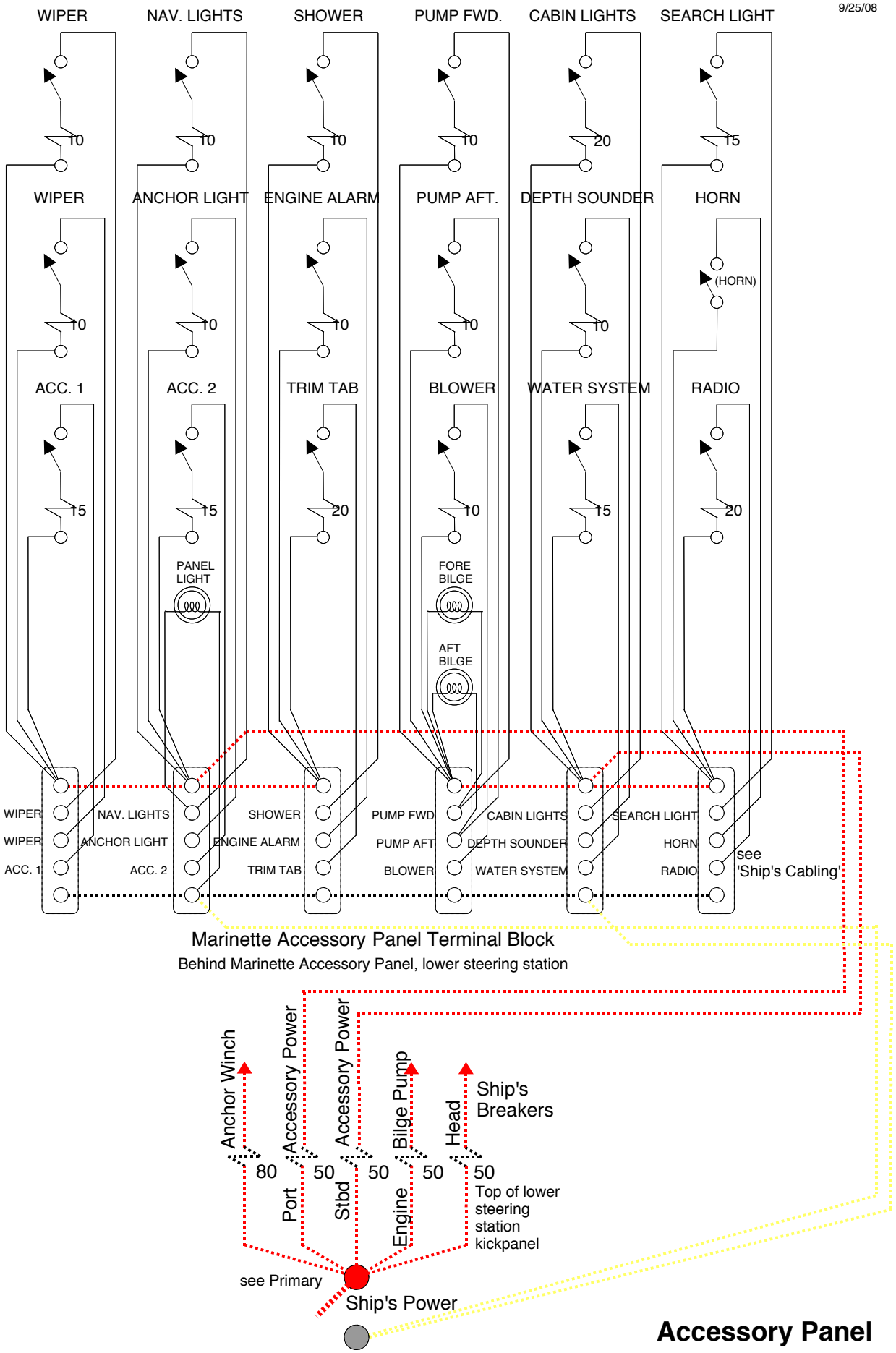


Ship's Cabling

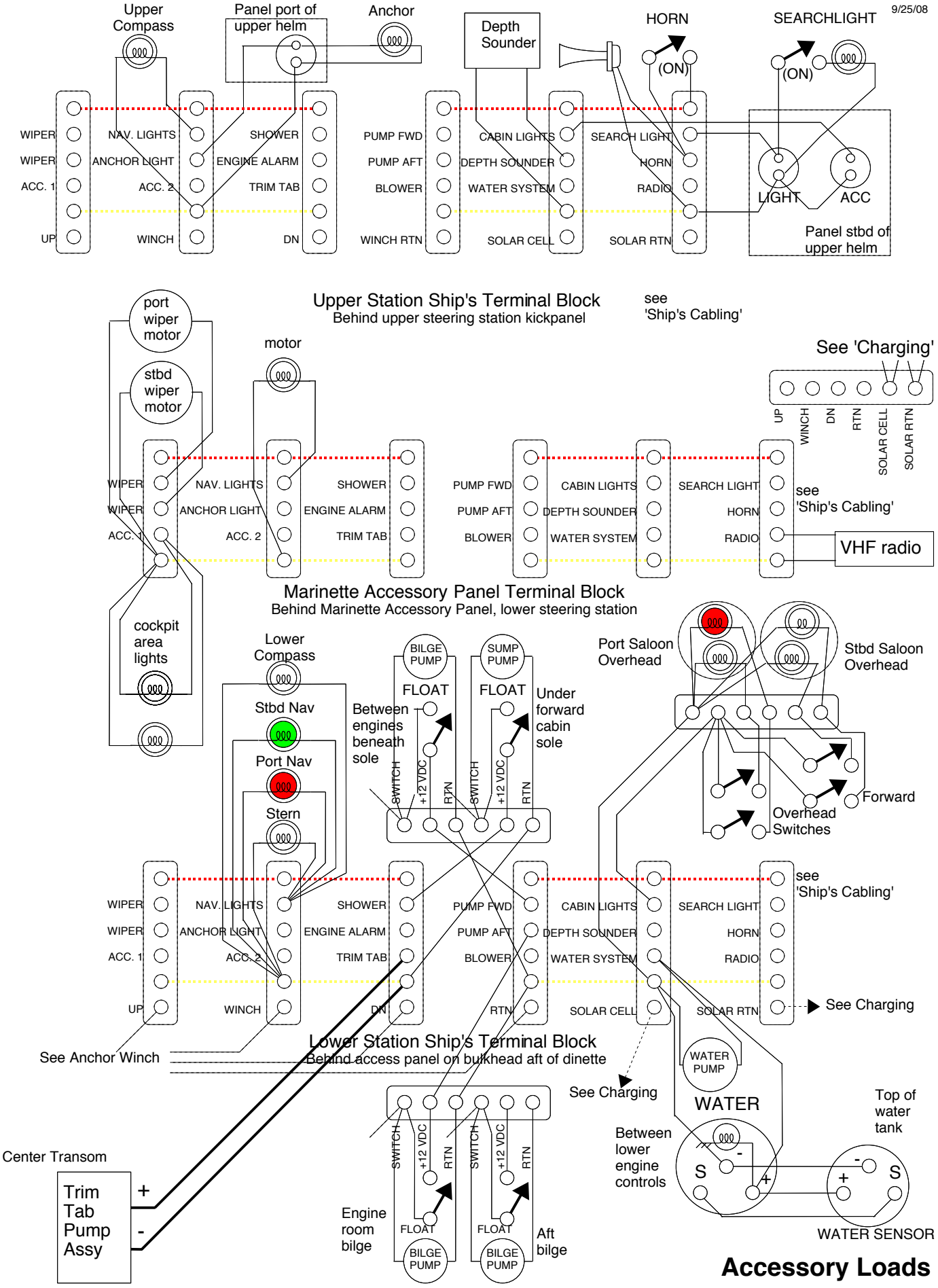

Upper Station Ship's Terminal Block
Behind upper steering station kickpanel
9/25/08
N/C
N/C
ACC. 1
UP
NAV. LIGHTS
ANCHOR LIGHT
ACC. 2
WINCH
N/C
ENGINE ALARM
TRIM TAB
DN
N/C
N/C
BLOWER
RTN
CABIN LIGHTS
DEPTH SOUNDER
N/C
SOLAR CELL
SEARCH LIGHT
HORN
RADIO
SOLAR RTN
UP
WINCH
DN
RTN
SOLAR CELL
SOLAR RTN
See Anchor Winch
Marinette Accessory Panel Terminal Block
Behind Marinette Accessory Panel
WIPER
WIPER
ACC. 1
NAV. LIGHTS
ANCHOR LIGHT
ACC. 2
SHOWER
ENGINE ALARM
TRIM TAB
PUMP FWD
PUMP AFT
BLOWER
CABIN LIGHTS
DEPTH SOUNDER
WATER SYSTEM
SEARCH LIGHT
HORN
RADIO
As-is Configuration
BROWN RUNNING LIGHTS
RED ANCHOR
ORANGE/WHITE ALARM
BLUE SHOWER PUMP
RED TRIM TABS
BLK RADIO
AUTO BP
AUTO BP
BRN
RED
ORN
BLU
GRN
RED
WTE
BRN
RED
RED
RED
BLK
RED
3
3
BLU
GRN
BLK
ORN
RED
GRN
YEL
BLU
GRN
BLK
ORN
RED
GRN
YEL
BLK
RED
RTN bus
BLUE HORN
GREEN BLOWER
BLACK BILGE PUMP
ORANGE SPOTLIGHT
RED DEPTH SOUNDER
GREEN WATER PUMP
YELLOW CABIN LIGHTS
AUTO BP DOWN
PB AFT
Lower Station Ship's Terminal Block
Behind access panel on bulkhead aft of dinette
Anchor Winch
Accessory Power
Accessory Power
Bilge Pump
Head
Ship's Breakers
80
50
50
50
50
see 'Primary'
Port
Stbd
Engine
Top of lower steering station kickpanel
Top of lower steering station kickpanel
Ship's Power
Ship's Cabling

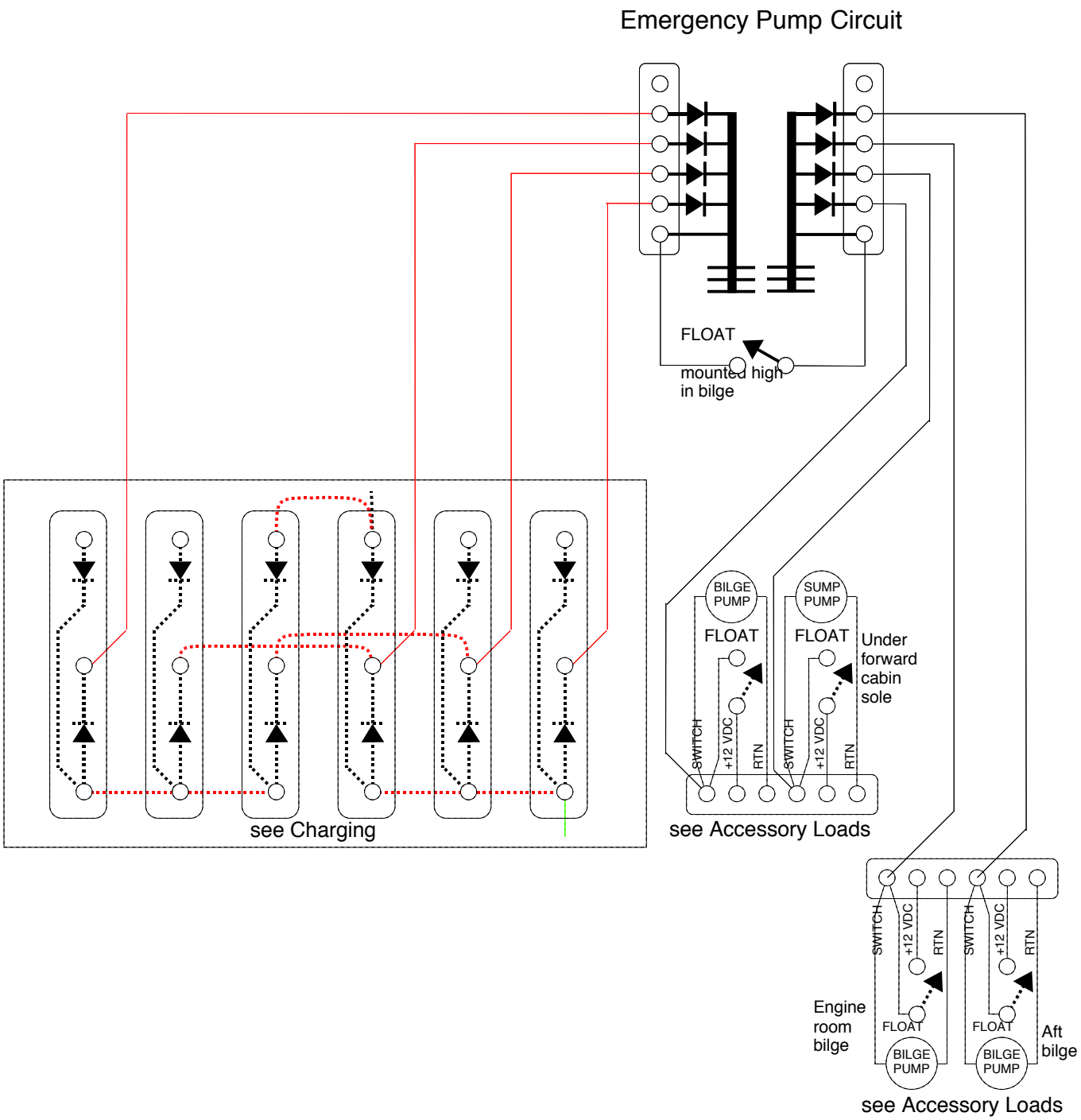


Anchor Winch

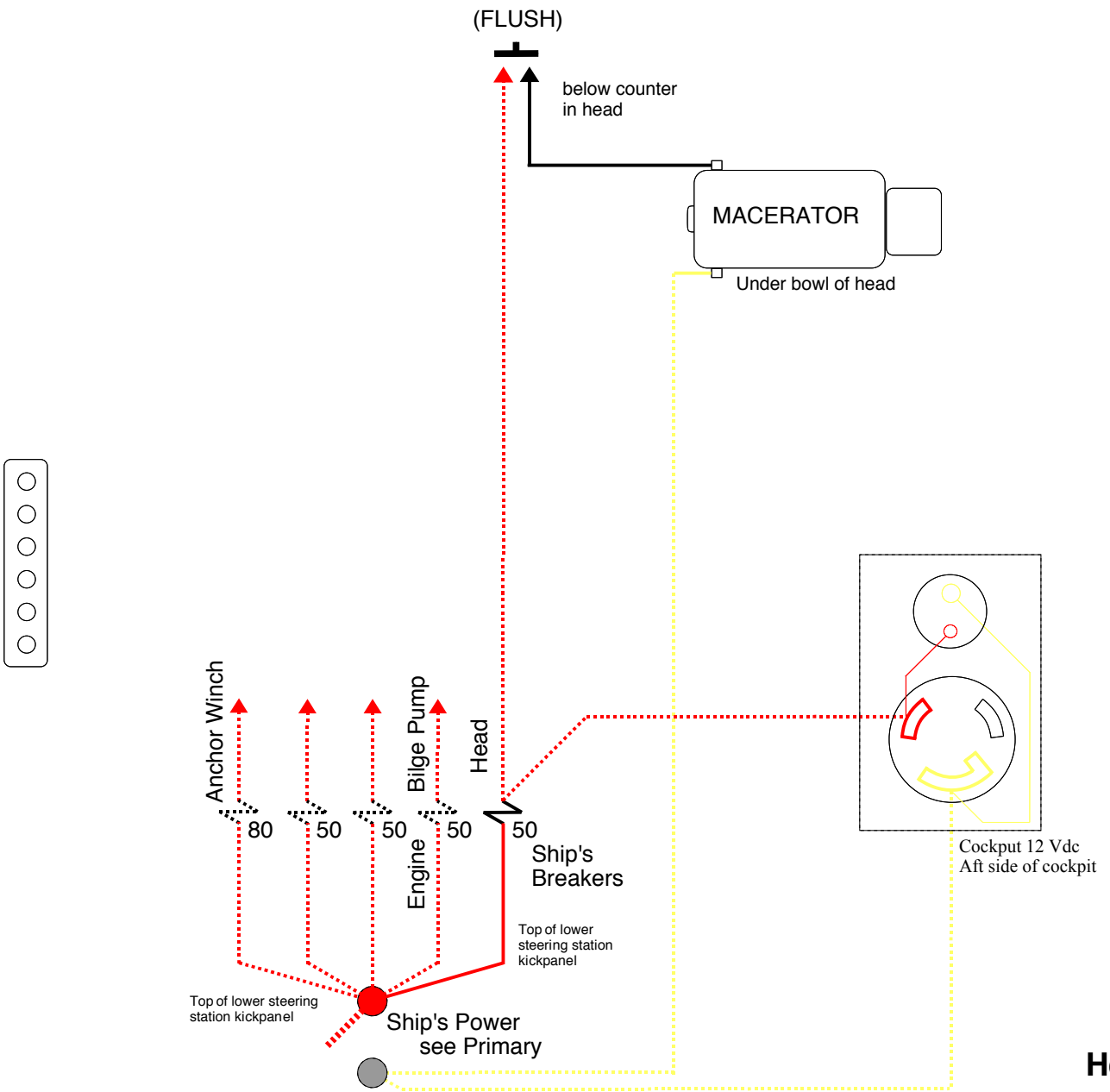

WIPER
NAV. LIGHTS
SHOWER
PUMP FWD.
CABIN LIGHTS
SEARCH LIGHT
10
10
10
10
20
15
WIPER
ANCHOR LIGHT
ENGINE ALARM
PUMP AFT.
DEPTH SOUNDER
HORN
10
10
10
10
10
(HORN)
ACC. 1
ACC. 2
TRIM TAB
BLOWER
WATER SYSTEM
RADIO
15
15
20
10
15
20
PANEL LIGHT
FORE BILGE
AFT BILGE
WIPER
WIPER
ACC. 1
NAV. LIGHTS
ANCHOR LIGHT
ACC. 2
SHOWER
ENGINE ALARM
TRIM TAB
PUMP FWD
PUMP AFT
BLOWER
CABIN LIGHTS
DEPTH SOUNDER
WATER SYSTEM
SEARCH LIGHT
HORN
RADIO
see 'Ship's Cabling'
Marinette Accessory Panel Terminal Block
Behind Marinette Accessory Panel, lower steering station
Anchor Winch
Accessory Power
Accessory Power
Bilge Pump
Head
Ship's Breakers
80
50
50
50
50
Port
Stbd
Engine
Top of lower steering station kickpanel
see Primary
Ship's Power
Accessory Panel

9/25/08

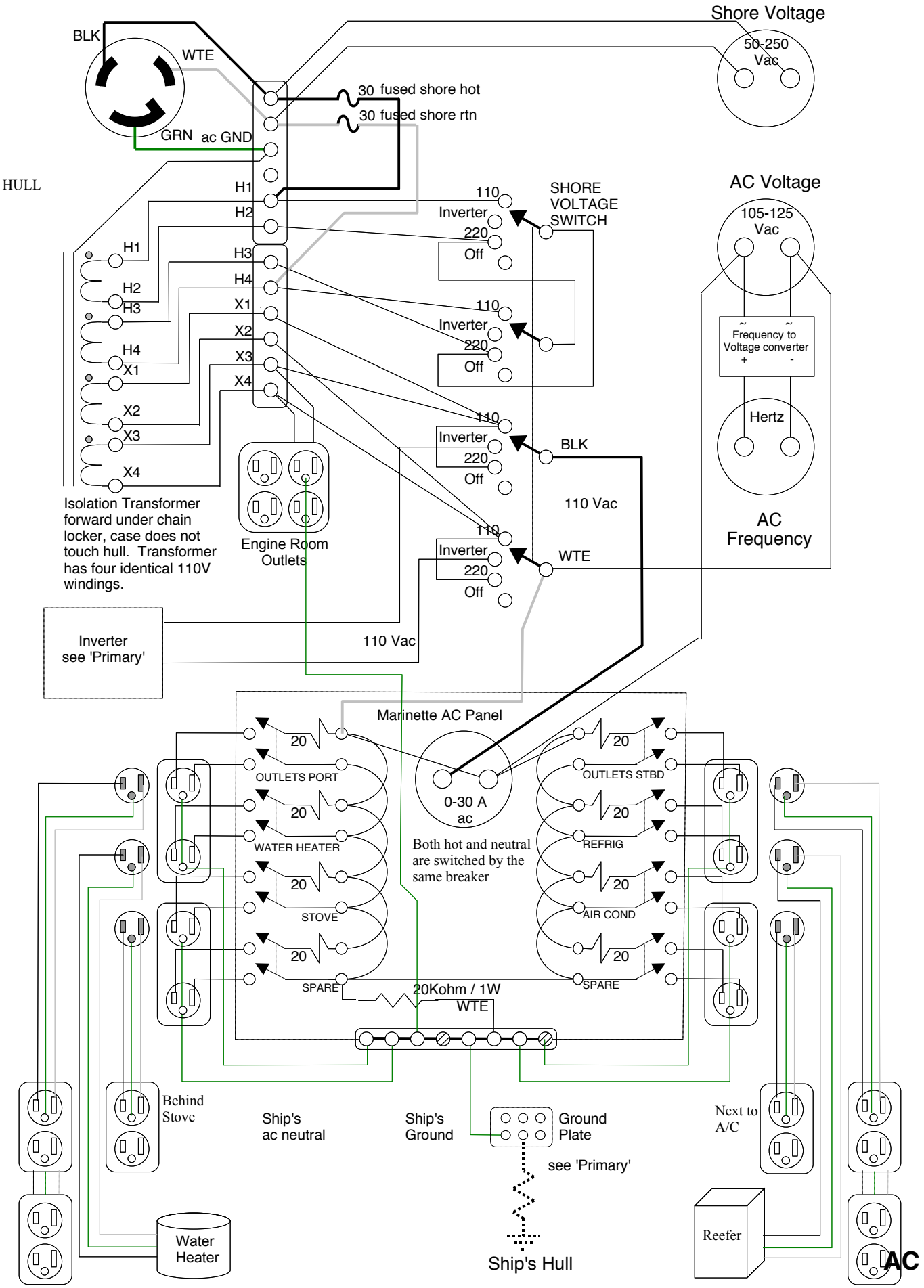

Upper Compass
Panel port of upper helm
Anchor
Depth Sounder
HORN
(ON)
SEARCHLIGHT
(ON)
WIPER
WIPER
ACC. 1
UP
NAV. LIGHTS
ANCHOR LIGHT
ACC. 2
WINCH
SHOWER
ENGINE ALARM
TRIM TAB
DN
PUMP FWD
PUMP AFT
BLOWER
WINCH RTN
CABIN LIGHTS
DEPTH SOUNDER
WATER SYSTEM
SOLAR CELL
SEARCH LIGHT
HORN
RADIO
SOLAR RTN
LIGHT
ACC
Panel stbd of upper helm
Upper Station Ship's Terminal Block
Behind upper steering station kickpanel
see 'Ship's Cabling'
port wiper motor
stbd wiper motor
motor
See 'Charging'
UP
WINCH
DN
RTN
SOLAR CELL
SOLAR RTN
see 'Ship's Cabling'
VHF radio
Marinette Accessory Panel Terminal Block
Behind Marinette Accessory Panel, lower steering station
cockpit area lights
Lower Compass
Stbd Nav
Port Nav
Stern
BILGE PUMP
SUMP PUMP
FLOAT
Between engines beneath sole
Under forward cabin sole
SWITCH
+12 VDC
RTN
Port Saloon Overhead
Stbd Saloon Overhead
Forward
Overhead Switches
see 'Ship's Cabling'
See Charging
See Anchor Winch
Lower Station Ship's Terminal Block
Behind access panel on bulkhead aft of dinette
WATER PUMP
WATER
See Charging
Top of water tank
Between lower engine controls
S
WATER SENSOR
Center Transom
Trim Tab Pump Assy
+
-
Engine room bilge
Aft bilge
Accessory Loads



Emergency Bilge Pump

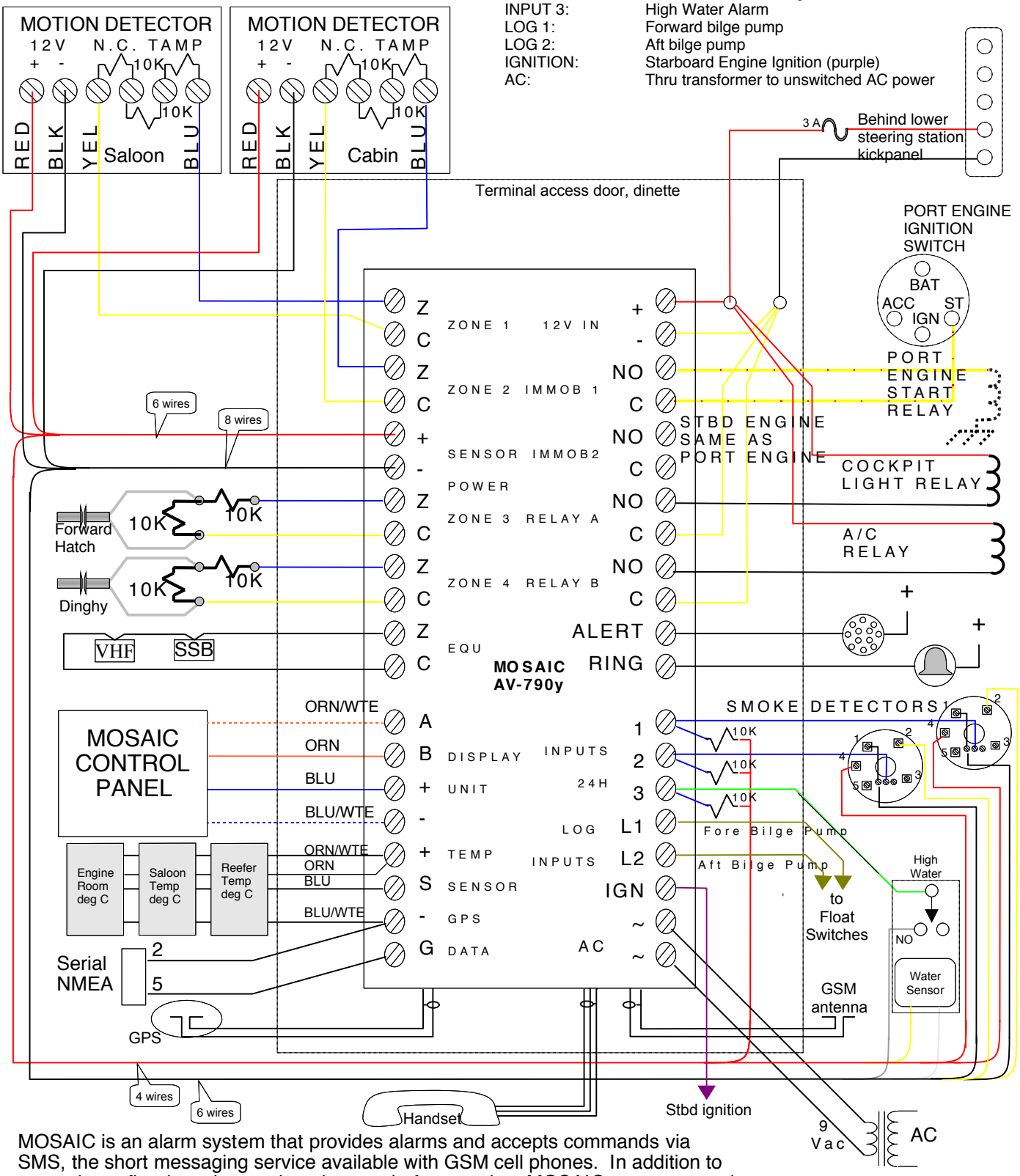

(FLUSH)
below counter
in head
MACERATOR
Under bowl of head
Anchor Winch
Bilge Pump
Head
80
50
50
50
50
Engine
Ship's
Breakers
Top of lower
steering station
kickpanel
Top of lower steering
station kickpanel
Ship's Power
see Primary
Cockput 12 Vdc
Aft side of cockpit

Head


Shore Voltage
50-250 Vac
BLK
WTE
GRN
ac GND
30 fused shore hot
30 fused shore rtn
HULL
H1
H2
H3
H4
X1
X2
X3
X4
110
Inverter
220
Off
SHORE VOLTAGE SWITCH
AC Voltage
105-125 Vac
Frequency to Voltage converter
Hertz
AC Frequency
BLK
WTE
110 Vac
Isolation Transformer forward under chain locker, case does not touch hull. Transformer has four identical 110V windings.
Engine Room Outlets
Inverter see 'Primary'
Marinette AC Panel
20
OUTLETS PORT
WATER HEATER
STOVE
SPARE
OUTLETS STBD
REFRIG
AIR COND
0-30 A ac
Both hot and neutral are switched by the same breaker
20Kohm / 1W
Behind Stove
Ship's ac neutral
Ship's Ground
Ground Plate
see 'Primary'
Next to A/C
Water Heater
Ship's Hull
Reefer
AC

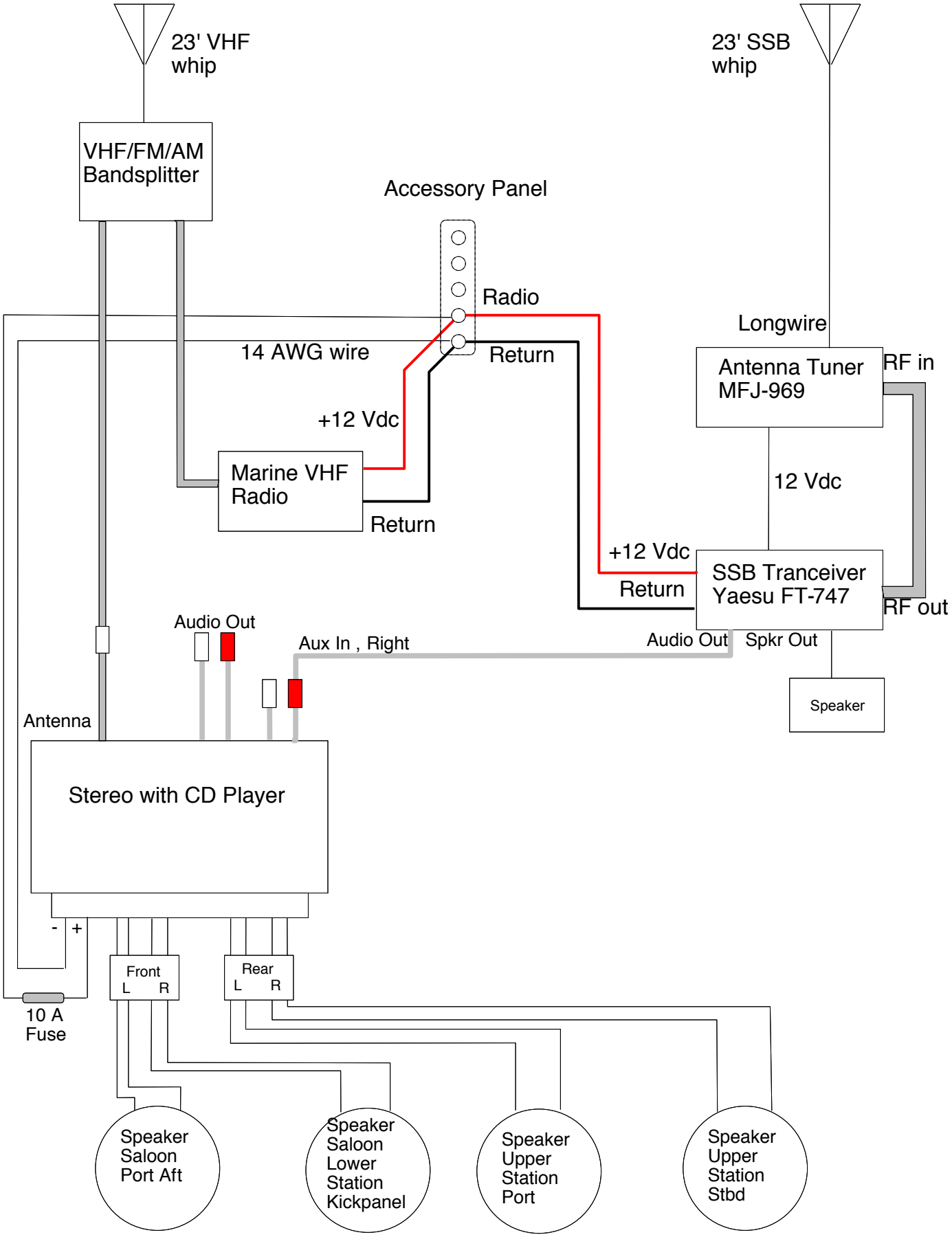
ZONE 1:	Motion Detector, Saloon
ZONE 2:	Motion Detector, Cabin
ZONE 3:	Forward Hatch
ZONE 4:	Dinghy
EQUIPMENT:	VHF, SSB,
DISPLAY UNIT:	Stbd of eyebrow panel
TEMP SENSORS:	Engine room, saloon, reefer
GPS DATA:	to computer RS-232 input

POWER:	Ship's Power thru 5A fuse
IMMOBILIZER 1:	C to Port Start Relay coil +, NO to Port Start
IMMOBILIZER 2:	C to Stbd Start Relay coil +, NO to Stbd Start
RELAY A:	Cockpit Lights
RELAY B:	Air Conditioner
ALERT:	Siren under upper station panel
RING:	Telephone Bell in saloon
INPUT 1:	Smoke Detector in galley
INPUT 2:	Smoke Detector in engine room
INPUT 3:	High Water Alarm
LOG 1:	Forward bilge pump
LOG 2:	Aft bilge pump
IGNITION:	Starboard Engine Ignition (purple)
AC:	Thru transformer to unswitched AC power

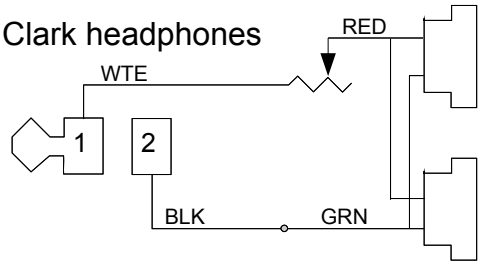


MOSAIC is an alarm system that provides alarms and accepts commands via SMS, the short messaging service available with GSM cell phones. In addition to entry alarm, fire detection, and equipment theft protection, MOSAIC measures and reports temperatures and remotely controls equipment such as air conditioning

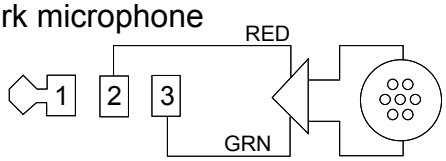
Alarm System


23' VHF
whip
23' SSB
whip
VHF/FM/AM
Bandsplitter
Accessory Panel
Radio
Return
14 AWG wire
+12 Vdc
Marine VHF
Radio
Return
Longwire
Antenna Tuner
MFJ-969
RF in
12 Vdc
+12 Vdc
Return
SSB Tranceiver
Yaesu FT-747
RF out
Audio Out
Aux In , Right
Audio Out
Spkr Out
Speaker
Antenna
Stereo with CD Player
-
+
Front
L R
Rear
L R
10 A
Fuse
Speaker
Saloon
Port Aft
Speaker
Saloon
Lower
Station
Kickpanel
Speaker
Upper
Station
Port
Speaker
Upper
Station
Stbd

Clark headphones



Clark microphone



Clark PTT switch