Com-Trol ADV-6000
Trouble Shooting Guide

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Introduction

The ADV-6000 is a graphical user interface or GUI system that works in conjunction with the MCS-4000 & 4500 line of controllers. Contrary to popular belief, the 6000 does not perform the actual controls at the facility level it is simply a central interface system for the controller network. The actual controls work is accomplish through the MCS-4000 or 4500 controllers.
This trouble shooting manual was put together to help field personnel proper trouble shoot and repair the 6000 series interface. You may call the Com-Trol tech support line (770) 918-1380 if you encounter a situation that is not covered in this guide or if it has been determined that a unit needs to be sent back for repair.

Tool Requirements (depending on level of trouble shooting):

- Standard hand tools (i.e. screw drivers, nut drivers, etc.)
- Good quality volt meter {(reads VAC/VDC to the 100th of a volt (i.e. 0.08 VDC)}
- Standard IBM or compatible keyboard

6000 Trouble Shooting Check List

	Yes	No	N/A
Was the correct cable used?			
If shielded cable was used is it installed properly?			
Are all connections tight and free from potential shorts?			
Is global bus separate from all hi voltage (including in conduit)?			
Have the proper resistors been placed in the proper locations?			
Is the 6k software current?			
Have all voltages been verified within proper limits?			
Was 'vtest1' run and verified ok?			
Is the 6k on a UPS?			
Have log files been deleted and rebuilt?			
Have all the voltages been verified within limits?			
Has the screen been calibrated using 'tzcal'?			

NOTE:
The use of *UR* type connectors is not recommended for communication bus connections. *UR* connectors are intended for use with solid core wire only; *UR* current tolerances are not suitable for EMS application. Gel filled 'B' type connectors (dolphins) need to be used for communication bus and sensor connections. All wiring must be stripped and twisted before crimping the 'B' connector.

Gel Filled 'B' Connectors (Dolphins)

WARNING: Never turn off the power to the 6000 unless you have activated the 'power down' feature found in the Service Menu or using a keyboard type <Alt – X> to shell to dos.

Problem	Possible Cause	Possible Solution
6k has lost communication with the boxes (4k's). An indication that the 6k has lost communication with a 4k is an audible 'beep' coming from the 6k.	• Improper cable was used during installation	• Verify cable type used is approved by Com-Trol specifications. • If shielded cable is being used it must be installed properly. The drain leg must be passed through at each splice / connection and taped off in a manner so that it does not touch ground. At the far end the drain leg must be cut off and the cable end taped. At the other end the shield must go to a good earth ground – not to the ground on the Phoenix connector. • 4 conductor cable must never be used for global or local bus wiring as it will add capacitance to the bus.
	• Wire has poor connection	• Verify all global bus wiring is properly inserted into the phoenix connector or terminal strip and the screws to secure the wires are tight. • UR connectors are not intended for stranded wire. Remove UR connectors from global bus and re-splice wire with an approved Com-Trol connector.
	• Voltage induction or 'noise' caused by hi voltage.	• Make sure global bus cable is run in dedicated conduit separate from line voltage, Cat-5 and alarm wiring. In areas were conduit is not present make sure that low voltage communications wiring is not run parallel with line voltage within a distance of 18 inches. • Add a 100 ohm resistor to each end of the global daisy chain. If a 'star' configuration was used put a 1k ohm resistor at the 'star' and a 100 ohm resistor at the farthest global cable run.

Problem	Possible Cause	Possible Solution
6k lost communication (continued)	• Voltage spike from lightning or other source.	• Try turning off the power to the 6000 safely by using the power down feature in the Service Menu. Turn the 6k back on; if this restores communication upgrade the software in the 6k to the current version. • If communication is not restored start unplugging the global bus at each controller then plugging them back in one at a time. Once you find the one that's not communicating check the connections. Make sure there are no wire shorts at the phoenix connector or terminal strip. • Replace the comm chip in the 4k not communicating or replace the comm chip in the Modem Reset Board on the back of the 6000 (U2-75176).
	• Improper voltage to the 6000. (Brown out or other)	• Check voltage at hi voltage terminal inside 6000 (120 VAC). • Check Power from modem / reset board to CPU (5V to ground) • Check voltage at connector on top of CPU cover (red & black wires).
	• Over loaded communication bus	• Make sure resistors that have been installed on communication bus are of the proper resistance as outlined above. Bands should be brown – black – brown for 100 ohm and brown – red – brown for 1000 ohm. • Acceptable voltages across data -/+ or to ground is shown on chart on page 5.
	• Relay on modem / reset board locked up (not switching)	• Shell to dos, go to the C:\ Prompt and type < vtest1 >. Alternately use the 'A'&'B' keys for toggling the modem relay and the 'X'&'Y' for the global LED. You should hear / see them switch.
6k locked up (not responding to touch)	• Excessive power down / up to 6k from back up generator • Someone has been turning off the 6k excessively without using the power down feature.	• Try turning off the power to the 6000 safely by using a keyboard and typing <Alt – X>. Turn the 6k back on; if this restores operation upgrade the software in the 6k to the current version. • Move 6k power source to a dedicated line in a panel not being fed from the generator and free from large motors or intermittent hi draw appliances. • Install a 250 VA or larger UPS battery back up to supply power to the 6000 in the event of supply voltage interruptions. • Make sure the generator is cycling with 'no load' test switch on.

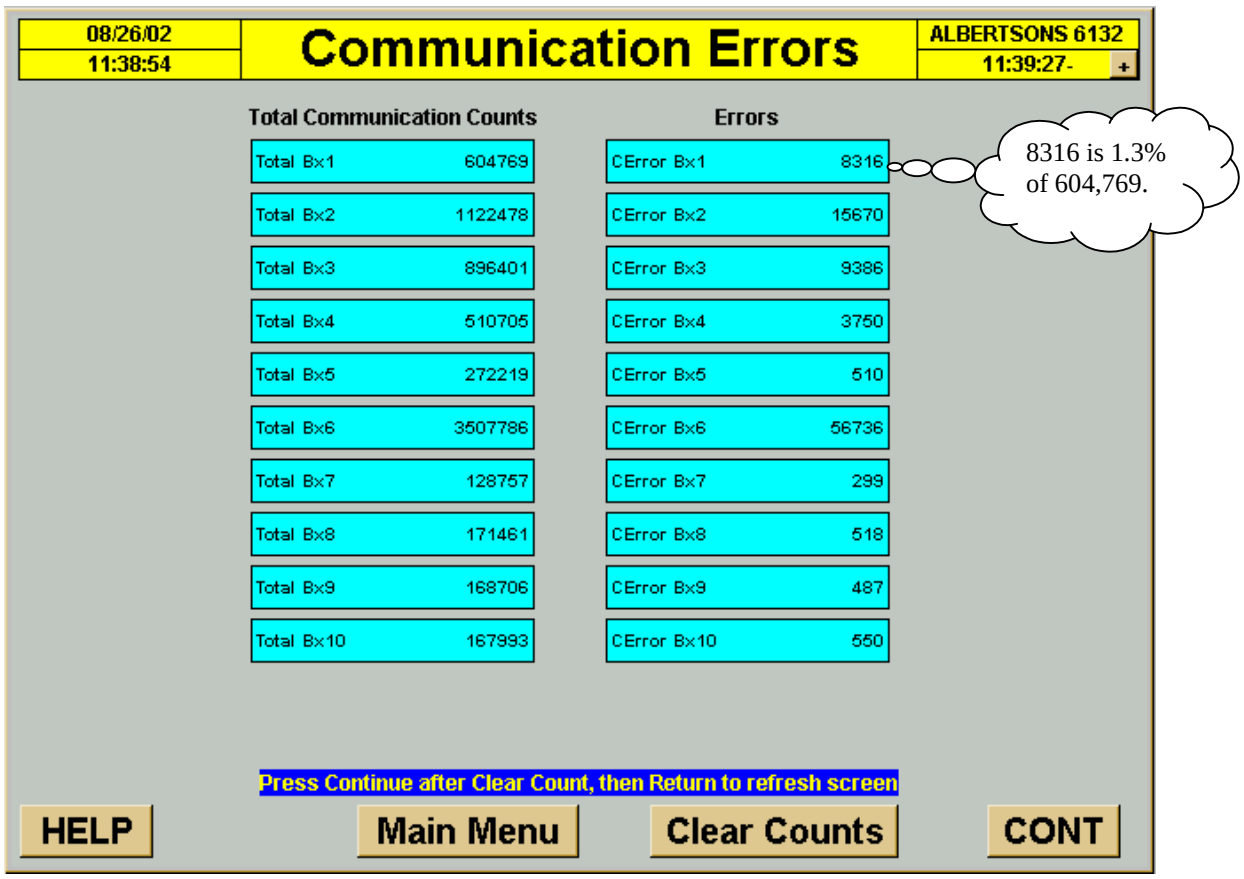
Problem	Possible Cause	Possible Solution
6k slow to respond to touch- Not locked up. An indication that the 6k is not locked up is by looking at the time clock in the upper left hand corner of the screen. If it is updating every 10 to 30 seconds instead of nearly every second. It is not locked up, but busy. Another indicator is if the global bus LED on the modem / reset board is flashing nearly constant.	• Double logging – to tell if you have double logging try logging a point that is not logged. There is a counter that will tell you the log number. A typical store with a sensor per case and 3 4k's should have around 350 logs max. If you see up towards 500 then there may be a problem. • If logs were built before all 4k's were on line- then logs are rebuilt. • If logs were built before 4k's had proper addressing and then logs are rebuilt. • If logs were built and then the store mnemonic was changed.	• Delete log files and rebuild. Call Com-Trol Tech support (770-918-1380) for instructions on how to do this.
	• Corruption in the 'defnz' directory files- indicated by having intermittent 'hieroglyphics', garbage or 'Unhandled Exception Error' code flash on screen.	• Upgrade 6k software to the current version to overwrite files in 'defnz' directory. • If unable to correct problem, return complete door assembly to Com-Trol for service. • Do not access CPU or LCD assemblies.
	• Screen needs to be calibrated	• Shell to dos and type < tzcal > to run the screen calibration program. Follow directions on screen.

Appendix – A - Expected Network Voltages

Without 100 ohm resistor	Voltages	*With 100 Ohm resistors*	*Voltages*
Data - & Data +	3.5 to 4.5 VDC	*Data - & Data +*	*0.08 to 0.7 VDC*
Data + & Com	3.0 to 4.2 VDC	*Data + & Com*	*2.5 to 2.7 VDC*
Data - & Com	0.08 to 1.5 VDC	*Data - & Com*	*2.5 to 2.7 VDC*

- The voltages can be taken with or without the bus plugged in.
- Unless there is something shorted out on the Data +, the problem is normally between the Data - & Com with nominal readings about 0.0001VDC.
- A meter that can read in the hundredths of a volt or smaller of a volt should be used (i.e. 0.08 VDC).

Appendix – B – Communications Error Screen



About version 391m or higher:

- A feature has been added to 'count' the number of communication errors on the global bus. To access this feature, go to Service Menu / 4k's; at the bottom of the screen is a 'comm error' button. An acceptable amount of errors should not exceed 5% of total communication counts per box. See example above.
- If the 6k looses communication it will do an automatic soft shutdown in an attempt to regain communication with the boxes.
- Any version after and including 394i 'scandisk' will auto-run anytime 6000 service is restored.

Appendix – C - Shielded Cable

PRIMARY USE OF SHIELD

The shield and it's ground wire (if applicable) are designed to reduce noise levels by absorbing induced voltages and sending them harmlessly back to ground. The shield is NOT to be used as a current carrying conductor or signal wire, as this may damage sensitive electronic equipment.

SPLICING

If the shielded cable has to be spliced, the shield has to be spliced as well. This will help ensure noise will have a continuous pathway back to ground.

BONDING

The shield has to be bonded at ONE END ONLY (preferably inside the control cabinet).

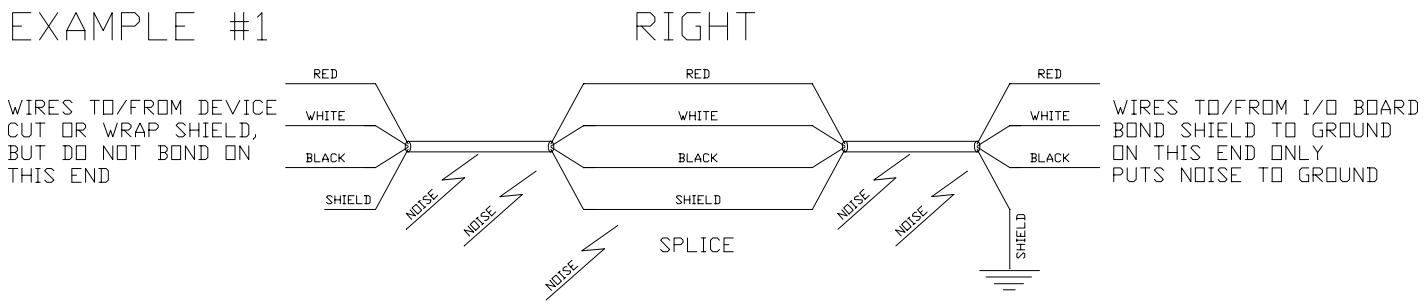
MIXING CLASS 1 & 2 WIRING

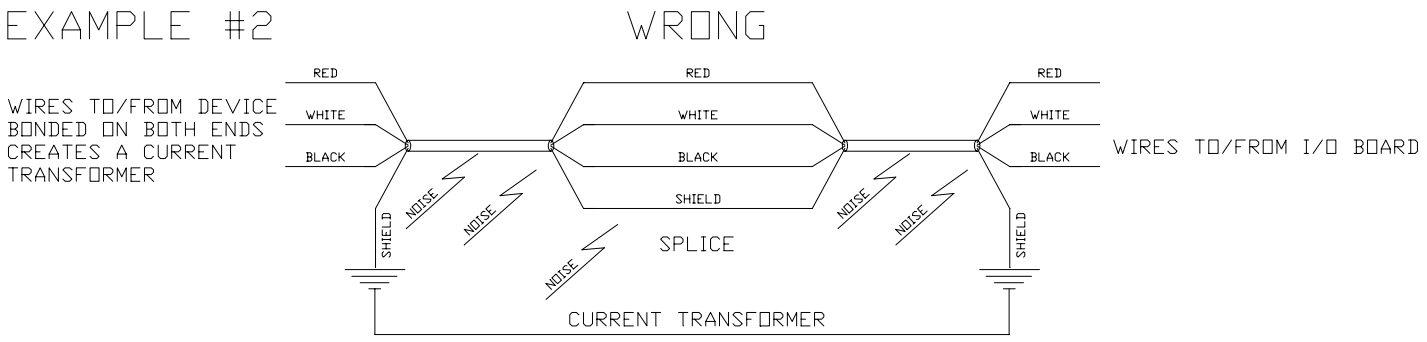
Do NOT run DC voltage or any signal wiring (even if it is shielded cable) with high voltage or even low voltage AC wiring.

Q. What about insulation being rated for highest voltage, as stated by NEC?

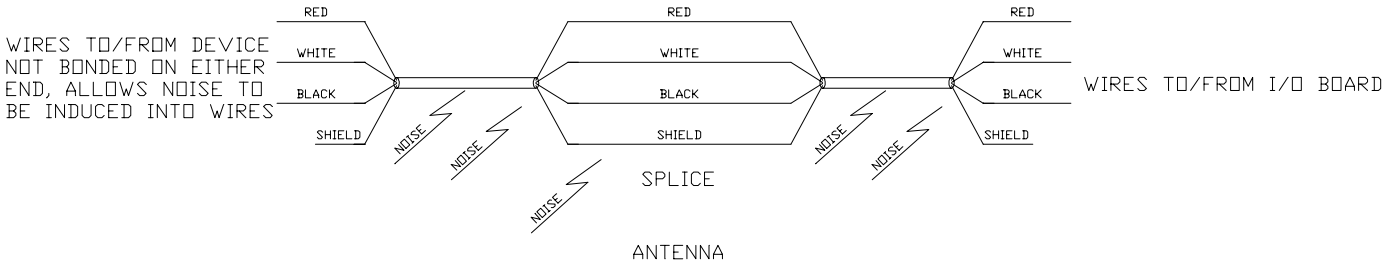
R. Would you run your telephone and cable television wires down the same weather head that supplies power to your house? Nobody would consider doing this, even if the insulation were rated per NEC.

Below are four examples of wiring, both correct and incorrect. At the end is a review describing each configuration.

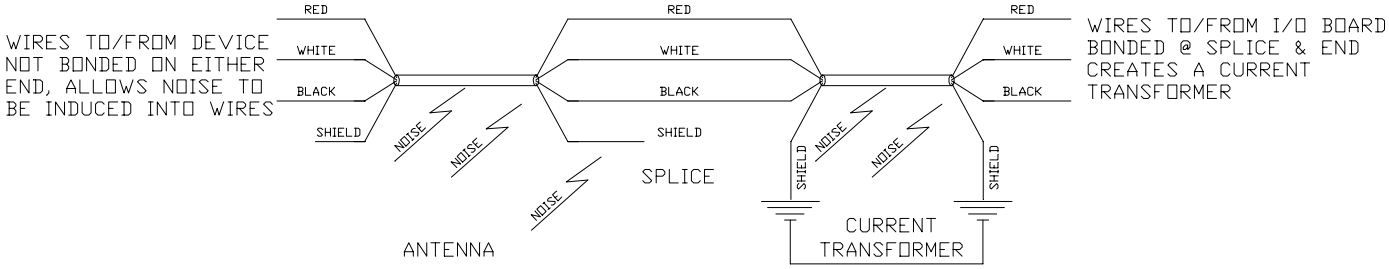




EXAMPLE #3 WRONG



EXAMPLE #4 WRONG



Example #1- The correct wiring for shielded cable. Shield is bonded on one end only and spliced with other wires.

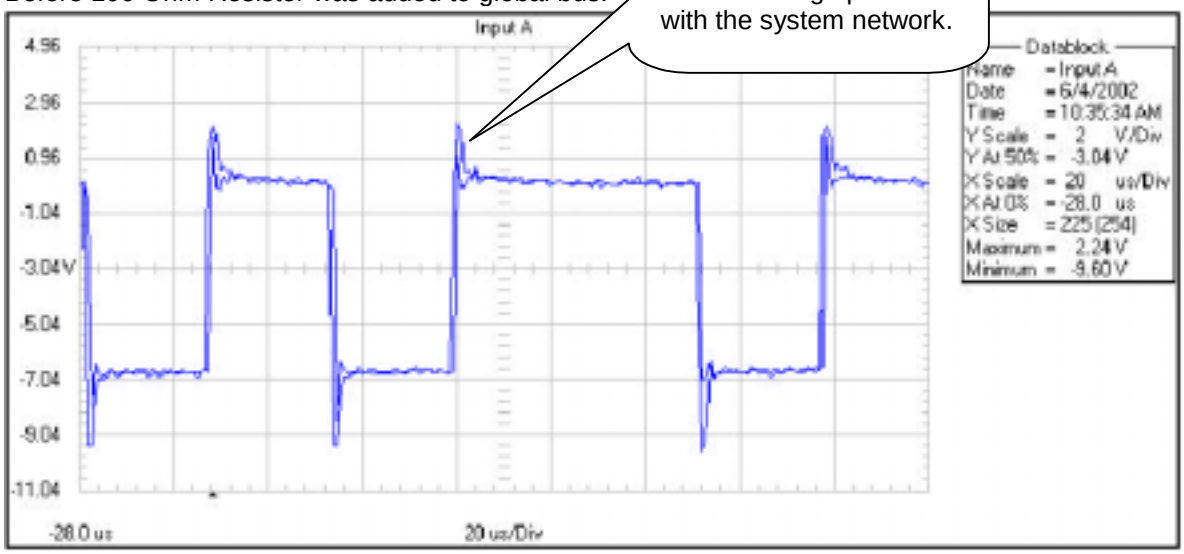
Example #2- One of the INCORRECT ways to install shielded cable. Shield is bonded on both ends, essentially creating a loop or current transformer. This can also be interpreted as the first winding of a coil, and a coil is used to create magnetic fields (like found in motors or used to open and close solenoid valves). This commonly causes ESD (Electro-Static Discharges), which damages processing chips and other computer related components.

Example #3- Another INCORRECT way to install shielded cable. Shield is NOT bonded on either end. This allows the shield to absorb the induced voltages, acting like an antenna, but since it's not properly bonded, the noise cannot be properly dissipated. This commonly causes signal to bounce or fluctuate erratically.

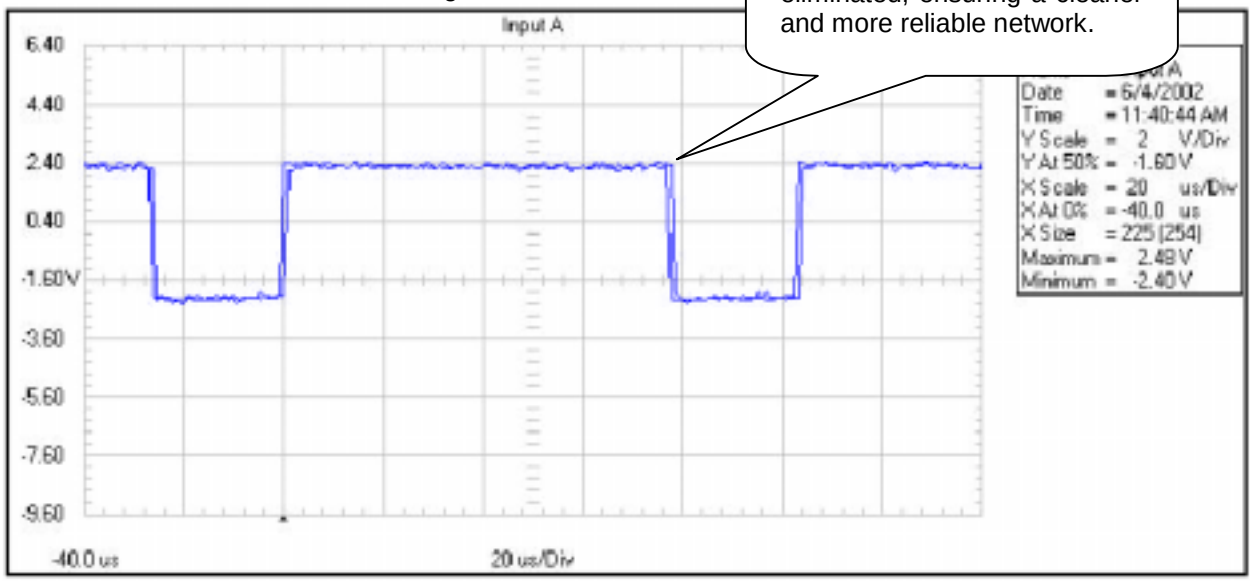
Example #4- Another common way to install shielded cable INCORRECTLY, the combination method. This incorporates both scenarios above, which unfortunately produces both problems. This example will make signals bounce while damaging electronic components.

Appendix – D – Scope readings

Before 100 Ohm Resistor was added to global bus.



After 100 Ohm resistor was added to global bus.



Appendix – E – Power Down

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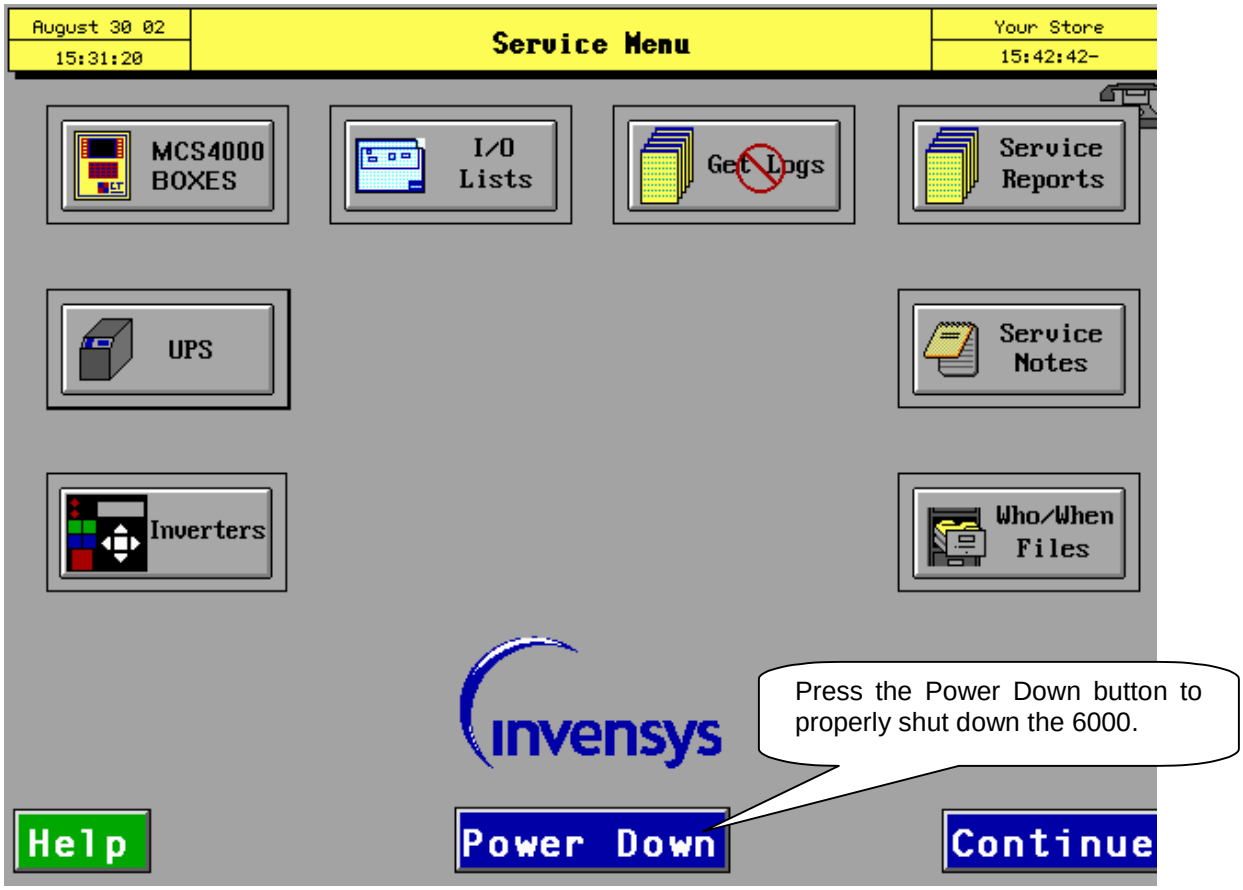
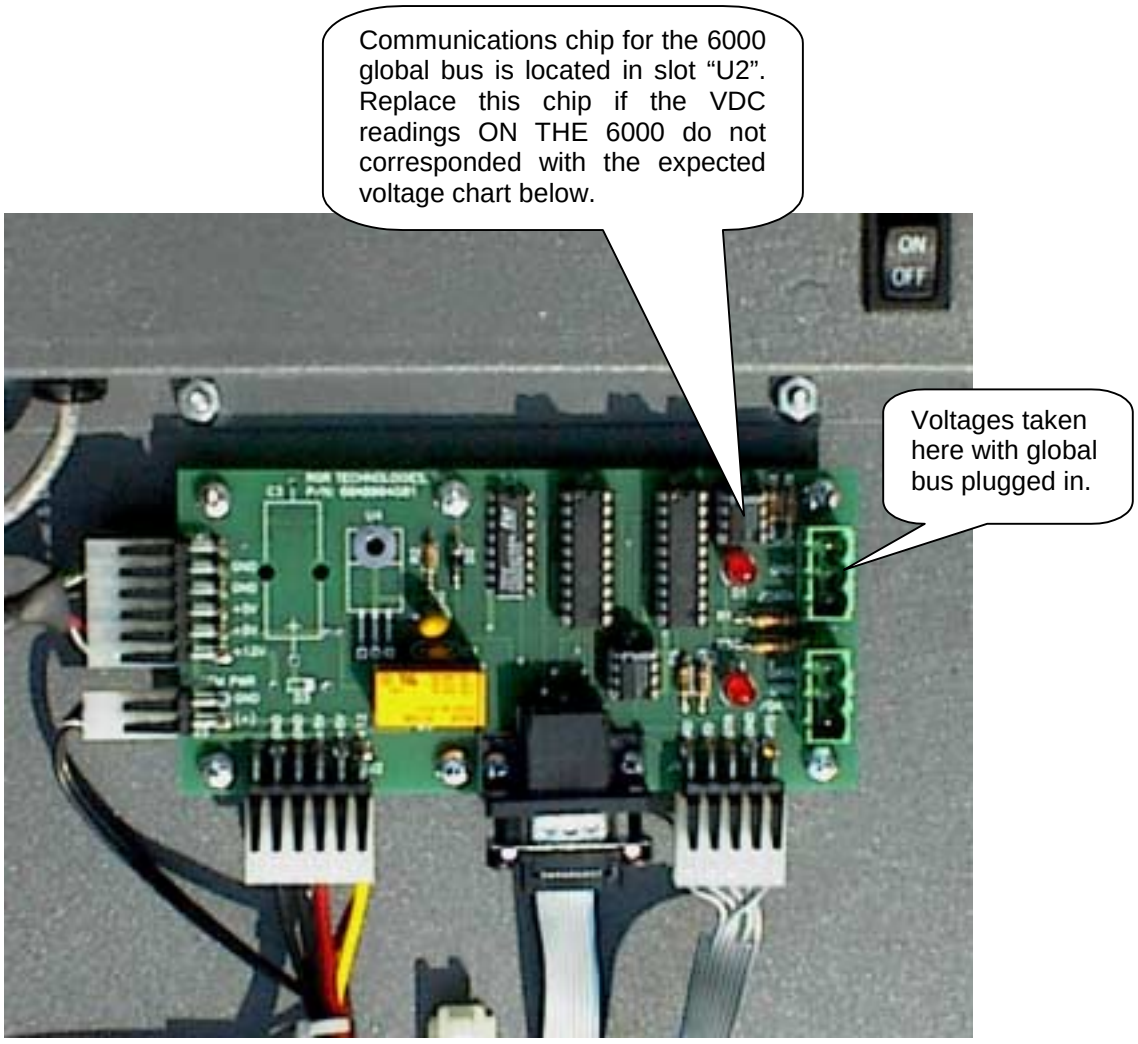


Appendix – F – 6000 Global Chip



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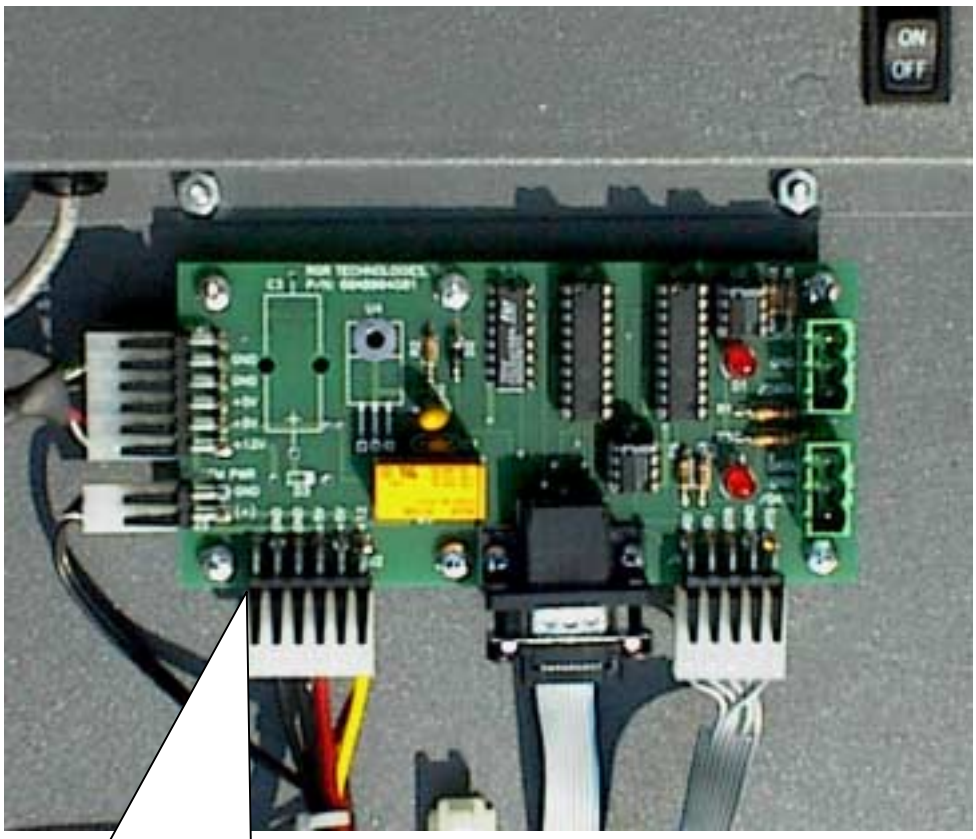
Data + & Com	3.0 to 4.2 VDC	*Data + & Com*	*2.5 to 2.7 VDC*
Data - & Com	0.08 to 1.5 VDC	*Data - & Com*	*2.5 to 2.7 VDC*

Appendix – G – 6000 Upline Voltage Checks



Test voltages between ground, 5 VDC and 12 VDC.

- 5 VDC powers: CPU and Touch Screen
- 12 VDC powers: Modem, screen lights, and peripheral devices (floppy drive & external keyboard)

Appendix – H – 6000 Screen Voltage Checks

Check between yellow and black for 5 VDC (touch screen doesn't work but back light does).

Check between red and black for 12 VDC (back lights are not working but 6000 seems to be operational)