

Model 600A20

Echo® Monitoring Software

Installation and Operating Manual

For assistance with the operation of this product, contact the PCB Piezotronics, Inc.

Toll-free: 800-959-4464 24-hour SensorLine: 716-684-0001 Fax: 716-684-3823 E-mail: imi@pcb.com Web: www.imi-sensors.com







Repair and Maintenance

PCB guarantees Total Customer Satisfaction through its "Lifetime Warranty Plus" on all Platinum Stock Products sold by PCB and through its limited warranties on all other PCB Stock, Standard and Special products. Due to the sophisticated nature of our sensors and associated instrumentation, field servicing and repair is not recommended and, if attempted, will void the factory warranty.

Beyond routine calibration and battery replacements where applicable, our products require no user maintenance. Clean electrical connectors, housings, and mounting surfaces with solutions and techniques that will not harm the material of construction. Observe caution when using liquids near devices that are not hermetically sealed. Such devices should only be wiped with a dampened cloth—never saturated or submerged.

In the event that equipment becomes damaged or ceases to operate, our Application Engineers are here to support your troubleshooting efforts 24 hours a day, 7 days a week. Call or email with model and serial number as well as a brief description of the problem.

Calibration

Routine calibration of sensors and associated instrumentation is necessary to maintain measurement accuracy. We recommend calibrating on an annual basis, after exposure to any extreme environmental influence, or prior to any critical test.

PCB Piezotronics is an ISO-9001 certified company whose calibration services are accredited by A2LA to ISO/IEC 17025, with full traceability to SI through N.I.S.T. In addition to our standard calibration services, we also offer specialized tests, including: sensitivity at elevated or cryogenic temperatures, phase response, extended high or low frequency response, extended range, leak testing, hydrostatic pressure testing, and others. For more information, contact your local PCB Piezotronics distributor, sales representative, or factory customer service representative.

Returning Equipment

If factory repair is required, our representatives will provide you with a Return Material Authorization (RMA) number, which we use to reference any information you have already provided and expedite the repair process. This number should be clearly marked on the outside of all returned package(s) and on any packing list(s) accompanying the shipment.

Contact Information

PCB Piezotronics, Inc. 3425 Walden Ave. Depew, NY14043 USA Toll-free: (800) 828-8840 24-hour SensorLine: (716) 684-0001 General inquiries: <u>info@pcb.com</u> Repair inquiries: <u>rma@pcb.com</u>

For a complete list of distributors, global offices and sales representatives, visit our website, <u>www.pcb.com</u>.

Safety Considerations

This product is intended for use by qualified personnel who recognize shock hazards and are familiar with the precautions required to avoid injury. While our equipment is designed with user safety in mind, the protection provided by the equipment may be impaired if equipment is used in a manner not specified by this manual.

Discontinue use and contact our 24-Hour Sensorline if:

- Assistance is needed to safely operate equipment
- Damage is visible or suspected
- Equipment fails or malfunctions

For complete equipment ratings, refer to the enclosed specification sheet for your product.

Definition of Terms and Symbols

The following symbols may be used in this manual:



DANGER

Indicates an immediate hazardous situation, which, if not avoided, may result in death or serious injury.



CAUTION

Refers to hazards that could damage the instrument.



NOTE

Indicates tips, recommendations and important information. The notes simplify processes and contain additional information on particular operating steps.

The following symbols may be found on the equipment described in this manual:



This symbol on the unit indicates that high voltage may be present. Use standard safety precautions to avoid personal contact with this voltage.



This symbol on the unit indicates that the user should refer to the operating instructions located in the manual.



This symbol indicates safety, earth ground.



PCB工业监视和测量设备 - 中国RoHS2公布表 PCB Industrial Monitoring and Measuring Equipment - China RoHS 2 Disclosure Table

	有害物 质					
部件名称	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴 联苯 (PBB)	
住房	0	0	0	0	0	0
PCB板	Х	0	0	0	0	0
电气连接 器	0	0	0	0	0	0
压电晶 体	х	0	0	0	0	0
环氧	0	0	0	0	0	0
铁氟龙	0	0	0	0	0	0
电子	0	0	0	0	0	0
厚膜基板	0	0	Х	0	0	0
电线	0	0	0	0	0	0
电缆	Х	0	0	0	0	0
塑料	0	0	0	0	0	0
焊接	X	0	0	0	0	0
铜合金 /黄 铜	Х	0	0	0	0	0
本表格依据 SJ/T 1	L1364 的 规定	E编制。				
O:表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。						
X:表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。 铅是欧洲RoHS指令2011/65/ EU附件三和附件四目前由于允许的豁免。						

CHINA ROHS COMPLIANCE

Component Name	Hazardous Substances							
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Chromium VI Compounds (Cr(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)		
Housing	0	0	0	0	0	0		
PCB Board	Х	0	0	0	0	0		
Electrical Connectors	0	0	0	0	0	0		
Piezoelectric Crystals	Х	0	0	0	0	0		
Ероху	0	0	0	0	0	0		
Teflon	0	0	0	0	0	0		
Electronics	0	0	0	0	0	0		
Thick Film Substrate	0	0	Х	0	0	0		
Wires	0	0	0	0	0	0		
Cables	Х	0	0	0	0	0		
Plastic	0	0	0	0	0	0		
Solder	Х	0	0	0	0	0		
Copper Alloy/Brass	Х	0	0	0	0	0		

This table is prepared in accordance with the provisions of SJ/T 11364.

O: Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.

X: Indicates that said hazardous substance contained in at least one of the homogeneous materials for this part is above the limit requirement of GB/T 26572.

Lead is present due to allowed exemption in Annex III or Annex IV of the European RoHS Directive 2011/65/EU.

Echo[®] Monitoring Software User's Manual



TABLE OF CONTENTS

1		8
1.1	Components Overview	
1.2	Regulatory Information	
1.	.2.1 United States of America - FCC Notice	
	.2.2 Canada - Industry Canada (IC) Notice	
1.	.2.3 Other Countries	
1.3	System Installation Overview	9
2	SCOPE	10
3	SOFTWARE INSTALLATION	10
3.1	Echo [®] Data Monitor Service Software Installation	11
3.2	Echo [®] Data Presentation Software Installation	11
3.3	Microsoft SQL Server Software	
	.3.1 SQL Server Initialization and Database Attachment	
3.	.3.2 Windows Install Location	
3.	.3.3 Database Attachment	12
3.4	Universal Data Link (UDL) File Configuration	12
4	ECHO [®] MONITORING SOFTWARE	14
4 4.1	ECHO [®] MONITORING SOFTWARE	
4.1		14
4.1	Echo® Data Monitor Service	14 16 17
4.1 4. 4. 4.	Echo® Data Monitor Service	14 16 17 17
4.1 4. 4. 4.	Echo® Data Monitor Service	14 16 17 17 17
4.1 4. 4. 4. 4.	Echo® Data Monitor Service	14 16 17 17 17 17
4.1 4. 4. 4. 4.	Echo® Data Monitor Service	14 16 17 17 17 17 19
4.1 4. 4. 4. 4.	Echo® Data Monitor Service	
4.1 4. 4. 4. 4.	Echo® Data Monitor Service	
4.1 4. 4. 4. 4.	Echo® Data Monitor Service	
4.1 4. 4. 4. 4. 4.	Echo® Data Monitor Service	
4.1 4. 4. 4. 4. 4.	Echo® Data Monitor Service	
4.1 4. 4. 4. 4. 4. 4.	Echo® Data Monitor Service. 1.1 Search for Receivers 1.2 Configure the Receiver IP Address 1.3 Stop the Service. 1.4 Configure the Service SQL Interface 4.1.4.1 Receivers Tab 1.5 Echo® Data Modbus over TCP/IP Server Interface. 4.1.5.1 Modbus Register Mapping Method 4.1.5.2 Echo® Modbus Server – Sensor Mapping Method 4.1.5.2.1 Echo® Modbus Sensor Mapping Method Response Translation. Echo® Data Presentation Software	
4.1 4. 4. 4. 4. 4. 4. 4.2	Echo® Data Monitor Service. 1.1 Search for Receivers 1.2 Configure the Receiver IP Address 1.3 Stop the Service. 1.4 Configure the Service SQL Interface 4.1.4.1 Receivers Tab 1.5 Echo® Data Modbus over TCP/IP Server Interface. 4.1.5.1 Modbus Register Mapping Method 4.1.5.1 Function Code based Register Addressing. 4.1.5.2 Echo® Modbus Server – Sensor Mapping Method 4.1.5.2.1 Echo® Modbus Sensor Mapping Method Response Translation. Echo® Data Presentation Software	
4.1 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4.	Echo® Data Monitor Service. 1.1 Search for Receivers 1.2 Configure the Receiver IP Address 1.3 Stop the Service. 1.4 Configure the Service SQL Interface 4.1.4.1 Receivers Tab 1.5 Echo® Data Modbus over TCP/IP Server Interface. 4.1.5.1 Modbus Register Mapping Method 4.1.5.1.1 Function Code based Register Addressing. 4.1.5.2 Echo® Modbus Server – Sensor Mapping Method 4.1.5.2.1 Echo® Modbus Sensor Mapping Method Response Translation. Echo® Data Presentation Software	
4.1 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4.	Echo® Data Monitor Service	
4.1 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4.	Echo® Data Monitor Service. 1.1 Search for Receivers 1.2 Configure the Receiver IP Address 1.3 Stop the Service. 1.4 Configure the Service SQL Interface 4.1.4.1 Receivers Tab 1.5 Echo® Data Modbus over TCP/IP Server Interface. 4.1.5.1 Modbus Register Mapping Method 4.1.5.1 Function Code based Register Addressing. 4.1.5.2 Echo® Modbus Server – Sensor Mapping Method 4.1.5.2.1 Echo® Modbus Sensor Mapping Method Response Translation. Echo® Data Presentation Software	
4.1 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4.	Echo® Data Monitor Service	
4.1 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4.	Echo® Data Monitor Service	
4.1 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4.	Echo® Data Monitor Service	

Model 600A20, Manual #64448, Rev. C, ECO 50405

v6.3.0 1-20-2020

Echo[®] Monitoring Software User's Manual

4.2.6.4 EchoPlus [®] Sensor Device Configuration Utility	46
4.2.6.4.1 Minimum Transmission Interval	47
4.2.6.4.2 EchoPlus [®] Multi-Sample Acquisition Parameters	49
4.2.6.4.3 EchoPlus [®] Sensor Calibration Utility	51
4.2.7 Importing Echo [®] Sensor Configurations from Excel	52
4.2.8 Echo [®] Sensor Data Display Preferences	55
4.2.8.1 Multiple Databases	59
4.2.9 Echo [®] Channel Notes	
4.2.9.1 Echo [®] Channel Note Viewer	
4.2.9.1.1 Searching Channel Notes	
4.2.9.1.2 Viewing Channel Notes	
4.2.9.1.3 Deleting Channel Notes	
4.2.9.1.4 Viewing Sensor Data associated with a Note	
4.2.10 Determining Echo [®] Alarm Levels	
4.2.10.1 Echo [®] Alarm Generation Utility	
4.2.10.1.1 Alarm Generation Tab	
4.2.10.1.2 Customizing the Sensor List	
4.2.10.1.3 Alarm Generation - Selected Channel Data Tab	
4.2.10.1.4 Alarm Generation - Selected Channel Alarms Tab	
4.2.10.2 Echo [®] Alarm Templates	
4.2.10.3 Echo [®] Alarm Email Notifications	
4.2.10.3.1 Email Notification Test	
4.2.11 Sensor Transmission Reliability Utility	
4.2.12 Export Sensor Data	
4.2.13 DSP Status	
4.2.14 Main Screen Features 4.2.14.1 Receiver Connection Parameters	
4.2.14.1 Receiver Connection Parameters	
4.2.14.2 Setting the Receiver IF Address	
4.2.14.5 Enverbata Screen	
4.2.14.5 Historical Data Screen	
4.2.14.5.1 Maintaining Transmission Records	
4.2.14.5.2 Transmission Removal Utility	
4.2.14.5.3 Saving Transmission Records to a File	
4.2.14.5.4 Print Transmission Records	
4.2.14.5.5 Transfer Transmission Records to a Replacement Sensor	
4.2.14.5.6 Trend Plot Display Screen	
4.2.14.5.7 Change Alarm Levels Screen	
4.2.14.5.8 Echo [®] Data Deletion Utility Screen	
4.2.14.5.9 Sensor Status Screen	
4.2.15 System Level Alarm & Status Screens	
4.2.15.1 System Alarm Screen	105
4.2.15.1.1 Channel Alarm Dialog Screen	108
4.2.15.1.2 Alarm Status Screen Reports	
4.2.15.2 System Sensor Status Screen	110
4.2.15.3 Echo [®] System Overview Screen	
4.2.15.3.1 Customizing the System Overview Channel Selection.	
4.2.16 Database Merge Utility	113
4.2.16.1 Compare Sensor Definitions	
4.2.16.2 New Transmission Update	115
5 MICROSOFT SQL SERVER 2008 R2 EXPRESS INSTALLATION	117

6	CREATE A FILE DSN ODBC CONNECTION1	32
6.1	Create an EchoUser account in the EchoSQLData database	132
6.2	Part 2 – create an ODBC connection file on the client PC	144
	ble of Figures	
	re 1 – Universal Data Link (UDL) File Definition Utility	
	re 2 – Universal Data Link – SQL Database connection success	
	re 3 – PCB Echo [®] Data Monitor Service selected in the Services window	
	re 4 – PCB Echo [®] Status utility icon in the notification tray	
Figu	re 5 – PCB Echo [®] Status Window	15
	re 6 – PCB Echo [®] Data Service Status Window Menu options	
	re 7 – PCB Echo [®] Receiver Discovery Tool Window	
	re 8 – PCB Echo [®] Receiver Configuration Window	
	re 9 – PCB Echo [®] Data Service Configuration for Modbus	
	re 10 – Modbus Register Assignment Screen	
	re 11 – Modbus Register Assignment Screen – Filtered	
	re 12 –View Modbus Interface Echo [®] Sensor Data	
	re 13 –Restarting the PCB Echo [®] Data Monitor Service	
	re 14 – Modbus Configuration Screen – Sensor Mapping Method	
	re 15 – Modbus Sensor Mapping Method Request/Response Diagram	
0	re 16 – Modbus Sensor Mapping Method Response Translation Table	
	re 17 - PCB Echo [®] Data Presentation Main Screen – Link graph scaling & cursors	
	re 18 - PCB Echo [®] Data Presentation Main Screen	
	re 19 - PCB Echo [®] Data Presentation Main Screen Zoom	
	re 20 - PCB Echo [®] Data Presentation Main Screen with enlarged graph	
	re 21 - PCB Echo [®] Data Presentation Main Screen Menu bar Zoom options	
Figu	re 22 - PCB Echo [®] Data Presentation Main Screen Show Cursor option enabled	31
0	re 23 - PCB Echo [®] Data Presentation Main Screen with tracking cursors	
	re 24 – PCB Echo [®] Data Display Preferences Screen	
	re 25 – Context Help window when cursor is on the Sensor Tree	
	re 26 – PCB Echo [®] Main Screen showing status indications	
	re 27 – Main Screen Sensor Tree Short Cut Menu	
	re 28 – Administration Log in Dialog window	
	re 29 – Echo [®] Monitoring Receiver Configuration Menu Option	
	re 30 – Echo [®] Monitoring Sensor Configuration Menu Option	
Figu	re 31 – Echo [®] add sensor dialog	38
	re 32 – 670A01 Echo [®] Sensor Parameter Editor Screen	
	re 33 – Echo [®] Connection Menu item	
	re 34 – Echo [®] Configuration Utility	
	re 35 – Echo [®] Configuration Utility Connected	
	re 36 – Echo [®] Sensor Parameter Editor	
	re 37 – Set alarm values from a template	
	re 38 – Echo [®] Database Update Complete Dialog	
	re 39 – EchoPlus [®] Sensor Parameter Editor	
Figu	re 40 – EchoPlus [®] Configuration Utility	46

Figure 41 – EchoPlus [®] Configuration Utility Connected	. 47
Figure 42 – EchoPlus [®] Configuration Utility Update	. 48
Figure 43 – EchoPlus [®] Total Acquisition Time per Channel Table	. 49
Figure 44 – EchoPlus® Configuration Utility with Multi-Sample Acquisition Active	. 49
Figure 45 – EchoPlus® Configuration Utility Menu Options	. 51
Figure 46 – EchoPlus® Configuration Utility Calibration Factor Calculator	. 52
Figure 47 – Import Echo [®] Sensor Definitions from an Excel Spreadsheet	
Figure 48 – Import Echo [®] Alarm Templates from an Excel Spreadsheet	. 53
Figure 49 – Echo [®] Import Sensor Definitions from Excel Dialog screen	. 53
Figure 50 – Echo [®] Import Alarm Templates from Excel Dialog screen	. 54
Figure 51 – Echo [®] Add Alarm Templates Dialog	
Figure 52 – EchoPlus [®] Import Alarm Templates Screen	. 55
Figure 53 – Echo [®] Main Screen Menu options – Data Display Preferences	
Figure 54 – Echo [®] Data Display Preferences Screen before change	. 56
Figure 55 – Echo [®] Data Display Preferences Screen after change	
Figure 56 – Echo [®] Data Display Preferences Screen	
Figure 57 – Echo [®] Data Display Preferences 'Databases' tab	
Figure 58 – Echo [®] Add Channel Note	
Figure 59 – Echo [®] Channel Note Dialog Screen	
Figure 60 – Echo [®] Data graph with Channel Notes displayed	
Figure 61 – Echo [®] Channel Note Display Suppression	
Figure 62 – Echo [®] Channel Note Viewer Access	
Figure 63 – Echo [®] Channel Note Viewer Screen	
Figure 64 – Echo [®] Channel Note Viewer table menu options	
Figure 65 – Echo [®] Alarm Generation Screen	
Figure 66 – Echo [®] Alarm Generation Screen with multiple sensors selected	
Figure 67 – Echo [®] Alarm Generation Utility, Edit data set	
Figure 68 – Echo [®] Alarm Generation Utility, Edit Averaged Data dialog	
Figure 69 – Echo [®] Alarm Utility, Post edit operation	
Figure 70 – Echo Alarm Utility, Alarm Set Example	
Figure 71 – Echo [®] Alarm Utility, Alarm Type Setting	
Figure 72 – Echo [®] Alarm Utility menu bar items	
Figure 73 – Echo [®] Alarm Utility, Set Alarms Action	
Figure 74 – Echo [®] Alarm Utility, Custom Sensor Query	
Figure 75 – Echo [®] Alarm Utility, modified sensor list	
Figure 76 – Echo [®] Alarm Utility, Selected Channel Data tab	72
Figure 77 – Echo [®] Alarm Utility, Selected Channel Alarm Tab	73
Figure 78 – Echo [®] Alarm Utility, Create a New Template	
Figure 79 – Echo [®] Main Screen Menu Options – Edit Alarm Templates	
Figure 80 – Echo [®] Edit Alarm Templates Screen	
Figure 81 – Editing Alarm Templates Example	
Figure 82 – Echo [®] Main Screen Menu Options – Alarm Email Notifications	
Figure 83 – Echo [®] Alarm Email Notification configuration screen	
Figure 84 – Echo [®] Alarm Email Notification Test List Selection	
Figure 85 – Echo [®] Alarm Email Notification Test Screen	
Figure 86 – Echo® Sensor Transmission Reliability Utility – Selected Sensor Tab	. 79

Figure 87 – Echo [®] Sensor Transmission Reliability Utility – Reliability tab icons	80
Figure 88 – Echo [®] Sensor Transmission Reliability Utility – Associated Junction Box	
Channels Tab	
Figure 89 – Echo [®] Sensor Transmission Reliability Utility – Reliability Overview Tab	81
Figure 90 – Echo [®] Sensor Data Export Utility Screen	82
Figure 91 – Echo [®] DSPic Alarm Query Dialog	83
Figure 92 – Echo [®] Configuration menu items	
Figure 93 – Echo [®] Receiver Connections	
Figure 94 – Echo [®] Receiver Utility Menu Items	85
Figure 95 – Echo [®] Receiver Discovery Utility	
Figure 96 – Echo [®] Receiver IP determination using the serial port	86
Figure 97 – Echo [®] Receiver IP Address Utility Select	87
Figure 98 – Echo [®] Receiver IP Address Configuration Utility – Dynamic Example	88
Figure 99 – Echo [®] Receiver IP Address Configuration Utility – Static Example	89
Figure 100 – Echo [®] Receiver Live data screen	90
Figure 101 – Echo [®] Receiver Client Screen with a Receiver Connection	90
Figure 102 – Echo [®] Receiver Client Screen Log File Controls	
Figure 103 – Main Screen Sensor Tree Short Cut Menu to other Screens and Functions	
Figure 104 – Echo [®] Historical Sensor Data Screen	93
Figure 105 – Echo [®] Historical Sensor Data Screen Menu bar	
Figure 106 – Echo [®] Sensor Transmission Maintenance Screen	
Figure 107 – Echo [®] Transmission Removal Utility Screen	
Figure 108 – Echo [®] Transfer data to a replacement sensor Screen	
Figure 109 – Echo [®] Sensor Data Trend Screen	
Figure 110 – Echo [®] Sensor Data Trend Screen Data Selection Fields	
Figure 111 – Echo [®] Sensor Data Trend Screen Graph Tools	99
Figure 112 – Echo [®] Sensor Data Trend Screen Create Note process	
Figure 113 – Echo [®] Sensor Data Trend Screen Menu bar options 1	
Figure 114 – Echo [®] Change Alarm Level Dialog Screen	
Figure 115 – Echo [®] Change Alarm Confirmation 1	
Figure 116 – Echo [®] Data Deletion utility screen 1	
Figure 117 – Echo [®] Sensor Status Screen - Replace Battery 1	.03
Figure 118 – Echo [®] Sensor Status Screen - Replace Battery Soon 1	.03
Figure 119 – Echo [®] Sensor Status Screen Menu Bar Options 1	
Figure 120 – Echo [®] System View Options 1	
Figure 121 – Echo [®] Alarm Status Screen – Summary Tab 1	.05
Figure 122 – Echo [®] Alarm Status Screen – Summary Tab with a Sensor Selected 1	
Figure 123 – Echo [®] Alarm Status Screen – Selected Sensor Options	06
Figure 124 – Echo [®] Alarm Status Screen – Detail Tab 1	07
Figure 125 – Echo [®] Channel Alarm Dialog 1	08
Figure 126 – Echo [®] Channel Alarm Dialog Menu Bar Items 1	
Figure 127 – Echo [®] Alarm Status Screen Menu Bar 1	
Figure 128 – Echo [®] Last Measurement Report Preview Screen	
Figure 129 – Echo [®] System View – Sensor Status Screen	
Figure 130 – Echo [®] System View – Echo [®] System Overview Screen	
Figure 131 – Echo [®] System View – Echo [®] System Overview Screen information 1	

Figure 132 – Echo [®] System View – Echo [®] System Overview Custom Channel Select	tion
~	
Figure 133 – Echo [®] Main Screen – Tools menu option	. 114
Figure 134 – Echo [®] Database Merge Utility	. 114
Figure 135 – Echo® Database Merge Utility – Sensor definition mismatch dialog	. 115
Figure 136 – Echo® Database Merge Utility – Transmission Update Dialog	. 115
Figure 137 – Echo [®] Database Merge Utility – Confirmation Dialog	. 116
Figure 138 Microsoft SQL 2008 Initial Installation Screen	. 117
Figure 139 Microsoft SQL Server Setup Support Rules.	. 118
Figure 140 Microsoft SQL Server Component Installation Type	. 119
Figure 141 Microsoft Component Installer License Terms	. 120
Figure 142 Microsoft SQL Server Installer Feature Selection Dialog	. 121
Figure 143 Microsoft SQL Server Installer Instance Configuration	. 122
Figure 144 Microsoft SQL Server Configuration Dialog	. 123
Figure 145 Microsoft SQL Server Feature Selection Dialog	. 124
Figure 146 Microsoft SQL Server Authentication Mode Selection Dialog	. 125
Figure 147 Microsoft SQL Server Successfully installed Dialog	. 126
Figure 148 Microsoft SQL Server Management Studio Install Dialog	. 127
Figure 149 Microsoft SQL Server Management Studio Feature Selection Dialog	. 128
Figure 150 Launch Microsoft SQL Server Management Tools	. 129
Figure 151 – SQL Server Connection Dialog	. 129
Figure 152 – SQL Server Database Attachment Dialog	. 130
Figure 153 – SQL Server Database File Attachment Screen	. 131

PCB[®], IMI[®], Echo[®] and EchoPlus[®] are registered trademarks of PCB Piezotronics, Inc. in the United States. Microsoft[®], Windows[®], SQL Server[®], and Excel[®] are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. Modbus[®] is a registered trademark of Schneider Electric licensed to the Modbus Organization, Inc.

1 Introduction

The Echo[®] Wireless Vibration System is used for unattended predictive maintenance and condition monitoring of plant equipment. Echo[®] Wireless Vibration Sensors and EchoPlus[®] Wireless Junction Boxes activate automatically on a user defined schedule to capture and transmit vibration data wirelessly to one or more Echo[®] Receivers. The receivers, in turn, are connected by a wired Ethernet network to the Echo[®] Data Monitor Service Software running on a server or PC collecting and saving the transmissions to an SQL database. The Echo[®] Data Monitor Service also has a Modbus over TCP/IP server interface. The SQL interface is not required if only the Modbus function is to be used. If the SQL interface is active the vibration data are stored in the database and compared against alarm values. Machinery status is displayed in an alarm panel, and alarm notifications sent via email if desired. The data can be viewed, reported, and trended using the Echo[®] Data Presentation Software.

This manual is intended to assist users with the installation of the Echo[®] Monitoring Software package that includes model 600A20 Echo[®] Service Software and Echo[®] Data Presentation Software. Specific instructions for System Installation, Echo[®] Wireless Vibration Sensors, EchoPlus[®] Wireless Junction Boxes, and Echo[®] Receivers can be found in their respective manuals.

1.1 Components Overview

The Echo® Wireless Vibration System consists of the following components;

- Single channel Echo[®] Wireless Vibration Sensors
- 8-channel EchoPlus[®] Wireless Junction Box
- Echo[®] Receiver (Echo[®] Sensor Data server-Ethernet Interface)
- Microsoft[®] Windows[®] Based PC or Laptop with
 - Windows 7 or 10 Operating System
 - Model 600A20 Echo[®] Monitoring Software
 - Echo[®] Data Monitor Service Software (runs as Windows Service) with an SQL interface and a Modbus[®] interface.
 - Echo[®] Data Presentation Software
 - Microsoft SQL Server[®] Database software
 - Echo[®] Database (EchoSQLData.mdf)

1.2 Regulatory Information

1.2.1 United States of America - FCC Notice

FCC ID: ZOC-IMI673A01

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

1.2.2 Canada - Industry Canada (IC) Notice

IC: 9732A-IMI673A01

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

1.2.3 Other Countries

The Echo[®] devices have been certified and found to comply with the limits regulated by the regulatory agencies of several other countries and the European Union. Contact PCB[®] for more information.

1.3 System Installation Overview

The typical system installation will be integrated into a company's industrial LAN to ensure the receiver and PC's can communicate freely over Ethernet. This configuration would consist of:

- Echo[®] Wireless Vibration Sensor(s) and/or EchoPlus[®] Wireless Junction Box(s)
- Echo[®] Receiver(s).
- Dedicated PC or Server running 24/7 with a TCP/IP Ethernet interface to host the SQL database and Echo[®] Data Monitor Service Software with SQL and/or Modbus interfaces.

- Echo[®] Data Presentation Software required to view SQL data if the SQL interface is enabled.
- Sensors can be configured using any Echo software component.
- End-user PC(s) to host additional instances of the Echo[®] Data Presentation Software (optional and only applicable if the SQL interface is enabled).

The PC and the receiver(s) can be configured to acquire their IP addresses dynamically from the host network's DHCP server and would be connected as any other device on the network with an Ethernet cable, (Note: the Echo[®] Receiver is not a wireless Ethernet device). The receiver can also be set up to have a fixed IP address which often times is preferred since knowledge of the receiver's IP address is required by the software. A fixed IP address eliminates dynamic address expiration issues.

Echo[®] RF data transmissions are received by the Echo[®] Receiver and sent (Ethernet-TCP/IP) to the Echo[®] Data Monitor Service Software component of the Echo[®] Monitoring Software which runs as a service on the PC. For installations where the SQL interface is enabled, the sensor transmissions are saved in an SQL database running either on the same PC or a configured SQL server on the network. This data can be viewed on the acquisition PC or remotely using the Echo[®] Data Presentation Software component of the Echo[®] Monitoring Software. Data can also be exported or sent in response to a request (e.g. Modbus) to other industrial monitoring applications. For additional information on exporting data, contact IMI[®] Sensors.

NOTE: The Echo[®] system can also be set up as an isolated private LAN consisting of the PC and the receiver, both of which would be configured with fixed IP addresses and be connected using a crossover Ethernet cable. Echo[®] Sensor transmissions would be saved in the SQL database (also on the PC) and viewed using the Echo[®] Data Presentation Software.

2 Scope

This document describes the Echo[®] Monitoring Software installation and its use. It is assumed that the user is familiar with the hardware components of the system. This document applies to both the 916 MHz and the 868 MHz versions of the hardware.

3 Software Installation

There are two software components required for a typical installation; Echo[®] Monitoring Software and Microsoft SQL Server software. Microsoft SQL Server Express software is bundled with the Echo[®] Monitoring Software for easy access or can be downloaded separately from Microsoft. Alternatively, if the end-user already has Microsoft SQL Server installed then the Echo[®] database can simply be attached to it.

Note: The SQL component is not required if only the Modbus interface software is to be used.

The Echo[®] Monitoring Software is composed of two separate applications; Echo[®] Data Monitor Service Software and the Echo[®] Data Presentation Software. These programs are described below.

NOTE: You will need administrative rights to load the software and will most likely require the help of your IT department.

3.1 Echo® Data Monitor Service Software Installation

The service software should be installed on a server or dedicated PC that runs continuously (i.e. 24/7). The service has SQL and Modbus interfaces (model 600A20 software).

To install the Echo[®] Service Software, run the setup.exe file located on CD 1 (of 2) for the 600A20 software. If auto run is enabled the installation process will begin automatically. The CDs with the service also contain the SQL Express 2008 installer for 64 bit operating systems. For 32 bit operating systems download SQL Express from Microsoft's website.

The Echo[®] default directory is <u>C:\PCB\Echo</u> and should be used if possible. This installer installs the Echo[®] Service and a utility (PCBEchoNotify.exe) that runs in the notification tray to provide status and configuration information for the Echo[®] Service. After this installation completes an additional utility runs to configure the client software as a service and to update the windows registry. This software should typically be installed on only one PC.

3.2 Echo® Data Presentation Software Installation

To install the Echo[®] Data Presentation software, run the setup.exe located on CD 2 (of 2) of the 600A20 software and follow the instructions. If auto run is enabled the installation process will begin automatically. The default directory is <u>C:\PCB\Echo</u> and should be used if possible; however, if it is changed, it MUST match the directory that the Echo[®] Service Software is installed in. The Echo[®] Data Presentation software may be installed on multiple PC's.

3.3 Microsoft SQL Server Software

The Echo[®] Monitoring Software requires the installation of a compatible SQL Server application installed either locally (i.e. on the same PC) or available over a network connection if the Data Presentation Software is to be used. Microsoft SQL Server 20xx Express is a freely downloadable and distributable version of Microsoft SQL Server 20xx that satisfies this requirement. See section 5 for Microsoft SQL Server 2008 R2 Express installation instructions. Microsoft SQL Server 2012 Express installation is similar. Subsequent references to SQL Server in this document refer to SQL Server 2008 R2.

3.3.1 SQL Server Initialization and Database Attachment

After the Echo[®] Data Monitor Service, Echo[®] Monitoring Software and the SQL database engine are installed there are two important steps required to connect the these applications, if the SQL interface is used, so the sensor data can be stored and retrieved from the database;

- The Echo[®] Sensor Database supplied with the software must be 'attached' to the database server. Alternatively, an SQL query (*C:\PCB\Echo\Database\Create EchoDB vX.XX.sql*) is provided that can be run in MS SQL Server Management Studio to create the EchoSQLData database on the database server.
- The Universal Data Link (UDL) file must be configured to link the software queries to the database server.
- A Database Source Name (DSN) file can also be used. However, if you use a DSN, then the commands must be translated from OLE DB to ODBC through the OLE DB Provider for ODBC. Therefore, it is more efficient, and recommended, to use UDLs as the method of connection with the database if an OLE DB Provider is available.

3.3.2 Windows Install Location

Prior to Attaching' the database you should copy the Echo[®] database files;

- C:\PCB\Echo\Database\ EchoSQLData.mdf
- C:\PCB\Echo\Database\ EchoSQLData.ldf

To the SQL server data directory typically;

• Win 7 64-bit - C:\Program Files\Microsoft SQL Server \ MSSQL10_50.SQLEXPRESS\MSSQL\DATA

3.3.3 Database Attachment

Once the Echo[®] database files are copied to the appropriate SQL application directory then the database must be attached to the SQL server. If you are not familiar with this process refer to section 5.1 for instructions.

3.4 Universal Data Link (UDL) File Configuration

The next requirement is to link the Echo[®] Monitoring applications to the database engine. This is done by configuring Universal Data Link (UDL) file. To do this;

- Locate the file; C:\PCB\Echo\Database\ EchoDataSQL.udl
- Double click on it or open with OLE DB Core Services. The dialog in Figure 1 will appear
- Enter <Your PC Name>\SQLEXPRESS as the data source and make sure items 2 & 3 are as shown. Note: If you have a standard version of SQL Server, then do not add '\SQLEXPRESS' to the data source name.

X 🗊 Data Link Properties Provider Connection Advanced All Specify the following to connect to SQL Server data: 1. Select or enter a server name: MyPCName SQLEXPRESS Refresh 2. Enter information to log on to the server: Output State St Use a specific user name and password: User name: Password: Blank password Allow saving password 3. O Select the database on the server: EchoSQL Data • Attach a database file as a database name: EchoSQLData Using the filename: Test Connection OK Cancel Help

Echo® Monitoring Software User's Manual

Figure 1 – Universal Data Link (UDL) File Definition Utility

• Next click the 'Test Connection' button and verify the connection test succeeds. If not check to make sure the Server Name (from Figure 151) matched the Data source in the UDL file.

Microsoft Data Link	×
Test connec	ction succeeded.
	ок

Figure 2 – Universal Data Link – SQL Database connection success

4 Echo[®] Monitoring Software

The Echo[®] Monitoring Software consists of two applications; The Echo[®] Data Monitor Service and the Echo[®] Data Presentation software.

4.1 Echo® Data Monitor Service

The **Echo® Data Monitor Service Software** is sold with SQL and Modbus interfaces (model 600A20). The software can be configured for Modbus only operation, if desired, by disabling the SQL interface.

The Echo[®] Data Monitor Service Software collects transmissions and, if SQL is enabled, stores them in the database and sends alert emails in the event a transmission's data is out of range. If Modbus is enabled then the last transmission received from a sensor is saved and is used by the Echo[®] Modbus Server to respond to requests by a Modbus over TCP/IP client.

As its name implies this software runs as a windows service. The benefit of this is that it will start automatically when the PC is turned on, whether or not a user is logged on, and it will remain active even after a user logs off. This is essential for 24/7 industrial monitoring programs.

There are two ways to ensure the service is functional.

- Open the Services window, Start | Control Panel | Administrative Tools | Services, and look for 'PCB Echo Data Monitor,' as shown in Figure 3 below (It should be 'Started' with options to Stop, Pause or Restart. Click Start if necessary).
- Right click the PCB icon (PCB Echo Service utility) in the notification tray (typically on the bottom right of the screen) as shown in Figure 4. This will show an option to 'Open Echo Status'. Selecting this opens the window shown in Figure 5. Clicking the **Get Status** button will update the status to show the Echo[®] receivers the service is connected to and the last transmission each has received.
 - The PCB Echo[®] Status application must run with administrative privileges because it can stop a service. Because of this it may not start automatically at startup in Windows 7. It can be run manually from Start | All Programs | PCB Echo Monitoring Software | PCB Echo Service Status or you can set it up as a scheduled task using the Administrative Tools | Task Scheduler

NOTE: There should NEVER be more than one instance of the Echo[®] Data Monitor Service running on a PC.

Services K 4 -File Action View Help 🦛 🧼 🔲 🖾 🧕 🛃 🗾 🕨 🔳 💵 🔍 Services (Local) Services (Local) . PCB Echo Data Monitor Name Log On As . Description Status Startup Type 🔍 OpcEnum Manual Local Syste... Stop the service Rental Controls Manual Local Service This service .. Pause the service 🔍 PCB Echo Data N Restart the service Reer Name Resolution Protocol Enables serv... Started Local Service Manual Reer Networking Grouping Enables mul... Manual Local Service Description: Reer Networking Identity Manager Provides ide... Started Local Service Manual Collects Echo Sensor transmissions Reformance Counter DLL Host Enables rem... Manual Local Service and stores them in the SQL database 🔅 Performance Logs & Alerts Performanc... Manual Local Service Reling and Play Enables a c... Started Automatic Local Syste... + • Ш • Extended / Standard /

Echo® Monitoring Software User's Manual

Figure 3 – PCB Echo® Data Monitor Service selected in the Services window

6						
	M	U		Θ,		
	t	8	8	X		
	P -1	Θ	-			
Open Echo Status 👘 😽						
Exit Notification						
	Contract of the local	Cardollar Co.				

Figure 4 –PCB Echo[®] Status utility icon in the notification tray

PCB Echo Service Status	x
Echo Service Echo Receivers Help	
Service PC IP Address	
2 Echo Receivers are Connected: 192.168.1.10 : Active 3/28/2018 11:07:30 AM 242 -> DB-> MB 10.101.121.219 : Active	*
	-
Get Status	

Figure 5 – PCB Echo[®] Status Window

The Echo[®] Status Utility provides control and status of the Echo[®] Data Monitor Service that runs continuously in the background collecting and storing Echo[®] sensor transmissions. This program should launch silently when a user logs on to the PC since a shortcut to it is placed in the startup directory when it is installed. However, if this fails to happen for some reason run: Start | All Programs | PCB Echo Monitoring Software | PCB Echo Service Status (PCBEchoNotify.exe in the install directory).

This utility's functions are accessed from the menu bar and the **Get Status** button. The service being queried for status can be on the same pc as this utility (localhost) or on a remote PC. To access a remote PC enter its IP address in the '**Service PC IP Address**' field and ensure the firewall has an exception entered for utility to get through to the remote PC.

NOTE: Only the Get Status and Find functions will work for remote PC access. You must be on the same PC as the service to configure, start or stop it.

Status is ascertained by activating the **Get Status** button. This sends a query to the service to which it responds with;

- The receivers it is tasked to monitor.
- The status of the connection to those receivers.
- The last transmission received from each receiver.

The last transmission indication shows the date and time that the transmission was received and may also contain "->DB" and/or "->MB". DB indicates the transmission was from a sensor registered for that receiver and was stored in the SQL database. MB indicates the Modbus interface is enabled and it was entered in the Modbus response file. An example of a status response is shown in Figure 5 above.

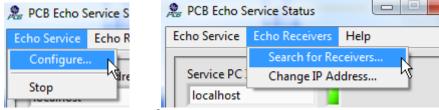


Figure 6 – PCB Echo® Data Service Status Window Menu options

The other functions available are accessed from the menu bar and include the following;

4.1.1 Search for Receivers

Echo Receivers | **Search for Receivers...** – In order to connect to a receiver, the receivers IP address must be determined and entered in the Receiver Parameter list's IP Address field. The procedure for setting a receiver's IP address is described in Section 4.2.14.2. To determine a receiver's IP address run the **Echo® Receiver Discovery Tool** from the menu bar. The screen shown in Figure 7 will appear. Clicking 'Search' should reveal the Echo® receivers, their assigned IP address and their internal unit ID. Enter the IP address seen here in the IP Address field of the Receiver Parameter list.

The utility starts with the 1^{st} 3 octets set to the same values as the PC's IP address it is running on with 255 in the last octet. If this setting fails to find a receiver, then try changing the 3^{rd} and 4^{th} octets to 255 and try again.

🖳 Receiver Discovery Tool 1.2.1	—		×
cvd from 10.101.121.219 10159 20 Echo Receiver IP Ad		i 14:23:59	^
			\sim
10 101 121	255	10.101.12	21.254
Search			

Figure 7 – PCB Echo[®] Receiver Discovery Tool Window

4.1.2 Configure the Receiver IP Address

Echo Receivers | **Change IP Address...** – The utility to configure a receivers IP address can be accessed from this application. See section 4.2.14.2 for details.

4.1.3 Stop the Service

If it becomes necessary to stop the service for any reason select the stop option. To Restart use the Windows 'Service' window found at Windows; Start | Control Panel | Administrative Tasks | Services. See Figure 13.

4.1.4 Configure the Service SQL Interface

Echo Service | **Configure** (the service) – Selecting 'Configure' will bring up the window shown in Figure 8 below. This window allows you to enter the parameters necessary to monitor a receiver, enable or disable the SQL interface and, if the Modbus option is installed, configure the Modbus responses to Modbus client requests. After any configuration changes are made they must be saved and the service must be stopped and restarted for them to take effect.

4.1.4.1 Receivers Tab

Receiver Parameters – All Echo[®] receivers are configured here. To add a receiver, enter the parameters in an available (dim) entry. To remove a receiver: right-click on the receiver of interest, and select the delete option.

- **Receiver Name** Enter any name you like to refer to the receiver.
- **IP address** Enter the IP address assigned to the receiver. You can use the Find utility described below to determine this.

- **SQL Server UDL File Path** Enter the UDL or DSN file path that defines what database the transmissions should go to. This is required if SQL DB Enable is checked.
- **SQL DB Enable** Check this box to have the Echo[®] transmissions stored in the database.
- Save Button Saves the current configuration information.
- **OK Button -** closes the window.

Receivers	Modbus			
	Receiver Parameters			
	Receiver Name	IP Address		^
	PCB Echo 1	10.101.211.24		
	SQL Server UDL Path	,		
	C:\PCB\Echo\Database\Ec	hoDataSQL.udl		
	Receiver Name	IP Address	Description	and Tip
	PCB Echo 2	10.101.121.219	Insert Elem	
	SQL Server UDL Path		Delete Elen	
	C:\PCB\Echo\Database\Ec	hoDataSQL.udl		
	Receiver Name	IP Address		
		localhost		
	SQL Server UDL Path			
	Receiver Name	IP Address		
		localhost		
	SQL Server UDL Path			
				~
	2 # Receivers	SQL Inte	erface Enable	

Figure 8 – PCB Echo® Receiver Configuration Window

4.1.5 Echo® Data Modbus over TCP/IP Server Interface

Model 600A20 software also hosts a Modbus Server capability in addition to the normal SQL Database interface. Its function is to service requests for Echo[®] data from a third party monitoring system (e.g. PI) using a Modbus over TCP/IP interface. Requests are made to the IP address of the PC hosting the Echo[®] Data Monitor Service Software using function code 0x03, Read Holding Registers, or 0x04, Read Input Registers. Which function code is used is up to the Modbus data client, they are responded to in the same way by the Echo[®] Modbus server.

The Modbus Ethernet slave daemon is launched automatically by the service when it starts. It listens on the default Modbus port (502 - but can be configured to use any port) and can accommodate multiple simultaneous connections.

The Echo[®] Data Monitor Service Software offers two mapping methods to accommodate Modbus client requests for data; Register and Sensor. These are described below.

Velocity and Acceleration Display Units – Separate controls for selecting the display units of velocity and acceleration data are located at the bottom left of this screen for use in systems where only the Echo Service is installed. These affect how the Modbus data is displayed and transmitted in response to a Modbus client request. For velocity data select ips – English or mm/s – Metric. For acceleration data select g's – English or m/s² – Metric.

Echo[®] Monitoring Software User's Manual

e Receiv	er Utilities		
Recei	vers Modbus		
Mo	odbus Interface Parameters		
	Port	502	Modbus Register Mapping Method
	Adjust Register Address fo		Sensor - The Sensor Id is the Register Address
1	Mapping Method Register	•	Register - Registers are assigned to individual Sensor Data readings
	Modbus Register Configura	tion	
			14
	Active Echo Sensor Regist		Proposed Register Mapping
	Time High (2)	1	Time High (2) 1
	Time Low (2)	3	Time Low (2) 3
	RMS Vel IPS (2)	5	RMS Vel IPS (2) 5
	Peak Vel IPS (2)	7	Peak Vel IPS (2) 7
	RMS Accel g (2)	9	RMS Accel g (2) 9
	Peak Accel g (2)	11	Peak Accel g (2) 11
	True Peak Accel g (2)	13	True Peak Accel g (2) 13
	Crest Factor (2)	15	Crest Factor (2) 15
	Battery Status (1)	17	Battery Status (1) 17
	RF Status (1)	18	RF Status (1) 18
	View Register M	ap	Assign Registers
	Remove Register Assig	Inments	Find Available Registers
	View Modbus Server	Data	Starting after : 0

Figure 9 – PCB Echo® Data Service Configuration for Modbus

4.1.5.1 Modbus Register Mapping Method

The Register mapping method implements a traditional Modbus interface where data for a specific measurement is returned in a register or register pair. For Echo[®] Data a measurement is data for a single sensor and can be one of the following;

- RMS Velocity (IPS or mm/s)
- Peak Velocity (IPS or mm/s)

- RMS Acceleration (g's or m/s²)
- Peak Acceleration (g's or m/s^2)
- True Peak Acceleration (g's or m/s^2)
- Crest Factor

Additionally, there are 3 status items available; Battery Status, RF Status and the time the measurement was taken.

Measurement data is sent in response to Function code 0x03, Read Holding Registers, or Function code 0x04, Read Input Registers requests. All measurement data items are held in two register pairs (32 bits total) which need to be cast as IEEE single precision floating point numbers in the Modbus client software that receives the request response. For example, if the reading was 1.0 and the registers assigned to it are 5 & 6 it will be returned in 2 16-bit registers as 0x3F80 & 0x0000 where 0x3F80 is in the low address register (5) and 0x0000 is in the next higher address register (6).

The RF and Battery Status values (strength) are each returned in 1 16-bit register with a value between 0-3 where 3 is best.

The Time of acquisition is a 64-bit double precision value that represents the number of seconds since midnight January 1, 1904 GMT. This is returned in 4 16-bit registers as two measurement values time high and time low, each of which is 32 bits.

When the Register Mapping Method is used every measurement value of every sensor configured in the system must have Modbus registers assigned to it if its data is to be requested by the Modbus client software. The Echo[®] software makes the register assignment process simple. The control descriptions below Refer to Figure 9 when 'Register' is selected as the mapping mode. In Sensor mode, described later, none of these controls are relevant and are disabled.

4.1.5.1.1 Function Code based Register Addressing

Some Modbus clients will adjust the Address of a register by a value that is based on the Modbus message function code. Under this scheme, the Client SW specifies the function code and enters registers starting at address 0. For instance, their register address internally for the 1st register using a function code of 3 will be 40001 but the message will ask for register 0. Checking Adjust Register Address for FC will add the offset back to the message ensuring a 1-1 correspondence of the actual registers mapped between the Echo[®] Modbus server and the external Modbus client. Supported Function code offsets are:

- FC 3 Read Holding Registers Incoming addresses will have 40001 added
- FC 4 Read Input Registers Incoming addresses will have 30001 added

The Echo[®] Modbus Server register mapping should start at 30001 or 40001 if this is used by the client

Sensor Id – Enter the Id of the sensor whose data is being assigned to registers. When an Id is entered the software will search to see if the sensor already has registers assigned. If

so the values will appear on the left side of the screen under the 'Active Echo Sensor Register Map'. If no registers are assigned yet then the values will be 0. 0 is an invalid register assignment and will never be used.

Find Available Registers button – If no registers are assigned, or you want to change a sensors current assignment, then you can activate the '**Find Available Registers**' button. This button, used in conjunction with the '**Starting After**' control causes the software to search for available registers after the register number in the starting after control. Alternatively, you can enter the register values by hand. In any event, after each data item has a register assigned activate the '**Assign Registers**' button to record them for the Modbus server to use.

Assign Registers button – Activation of this button causes the register values in the 'Proposed Register Mapping' section to be assigned to the selected sensor.

Remove Register Assignments button – Activation of this button causes the register values currently reserved for the selected sensor, shown in the 'Active Echo Sensor Register Map' section to be cleared.

View Register Map button – Activation of this button causes the window shown below in Figure 10 to open and display all registers assignments currently in the system.

View Modbus Server Data button – Activation of this button causes the window shown in Figure 12 to open and display the last data received from the Modbus configured sensor. It is this data that will be sent in response to a Modbus Client request for the specified register.

cho® Modbus	Register Assignme	ents				Available
Register	Sensor ID	Data Value	Data Type	# Registers		37
1	14	Time High	F32	2		
3	14	Time Low	F32	2		38
5	14	RMS Velocity	F32	2		39
7	14	Peak Velocity	F32	2		40
9	14	RMS Accel	F32	2		
11	14	Peak Accel	F32	2		41
13	14	True Peak Accel	F32	2		42
15	14	Crest Factor	F32	2		
17	14	Battery Status	U8	1		43
18	14	RF Status	U8	1		44
19	32793	Time High	F32	2		45
21	32793	Time Low	F32	2		
23	32793	RMS Velocity	F32	2		46
25	32793	Peak Velocity	F32	F32 2		47
27	32793	RMS Accel	F32			48
29	32793	Peak Accel	F32	2		48
31	32793	True Peak Accel	F32	2		49
33	32793	Crest Factor	F32	2		50
35	32793	Battery Status	U8	1		
36	32793	RF Status	U8	1		51
						52
						53
					T	54

Figure 10 – Modbus Register Assignment Screen

In this screen the register number is displayed along with the Sensor Id and data value it is associated with. The data values numeric type and the number of consecutive registers required to hold it. The register assignments can also be displayed by data type by selecting a filter at the bottom of this screen as shown in Figure 11.

On the right of the screen is a list of available registers that have yet to be assigned.

A printout of the register assignments can be made by selecting '**Print**' from the menu bar. Two options are available; Print all and Print selected registers. To select registers to print, click the mouse in the table and drag it to highlight (in blue) the registers of interest.

Echo® Modbus	Register Assign	iments			Available
Register	Sensor ID	Data Value	Data Type	# Registers	
13	14	True Peak Accel	F32	2	38
31	32793	True Peak Accel	F32	2	
					39
					40
					41
					42
					43
					44
					45
					46
		All Danistan	ļ		
		All Registers Time High			47
		Time Low			48
		RMS Velocity			49
		Peak Velocity			50
		RMS Accel			
		Peak Accel			51
		✓ True Peak Accel			52
		Crest Factor			53
		Battery Status			EA
		RF Status			v 194 v
Refresh	Filter	True Peak Acreel 💌	Number of	Available Regis	ters 65498

Echo[®] Monitoring Software User's Manual

Figure 11 – Modbus Register Assignment Screen – Filtered

To close the window click the 'X' in the top right of the screen. This will return control to the Modbus configuration screen.

Sensor Id	Date Time	RMS Vel IPS	Peak Vel IPS	RMS Accel g's	Peak Accel g's	TruePeak Accel	Crest Factor	Battery	RF Status	SNR	DSP Status	
L4	11/21/2016 3:10 PM	1.39	1.96	0.00	0.00	0.00	0.00	3	3	48.8	Good	
32793	11/21/2016 1:04 PM	0.41	0.58	0.37	0.53	1.80	4.81	3	3	38.7	Good	

Figure 12 –View Modbus Interface Echo® Sensor Data

NOTE: For ANY changes to become effective, the changes must be saved by selecting the File | Save Configuration AND restarting the PCB Echo[®] Data Monitor Service as shown below.

After all registers are configured in the Echo[®] software they must also be configured in the third party monitoring software's Modbus client.

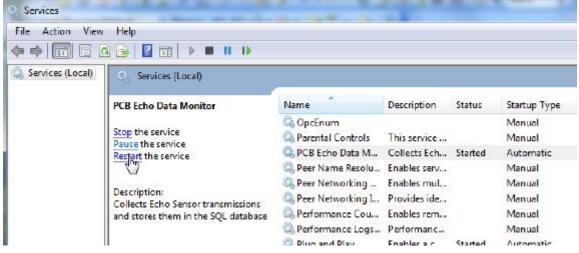


Figure 13 – Restarting the PCB Echo® Data Monitor Service

4.1.5.2 Echo[®] Modbus Server – Sensor Mapping Method

The Echo[®] Modbus Server sensor mapping method is a simple implementation that maps the register address (1-65,535) provided with function code 3 or 4 to an Echo[®] sensor id which also has a range of 1-65,535. The resulting response from the Echo[®] Modbus server is the 34 byte, most recent sensor transmission data, described below. The quantity values that accompany the start address field are ignored since only one response is possible in this mode. If no transmission is available for the requested sensor then exception code 4 is returned.

Receivers Modbus			
Modbus Interface Parameters			
Port	502	Modbus Register Mapping Met	hod
Adjust Register Address fo	r FC 📃	Sensor - The Sensor Id is the R Register - Registers are assigned	
Mapping Method Sensor	-	Sensor Data readings	
Modbus Register Regis	20		
		4	
Active Echo Sensor Regist	er Map	Proposed Register Mappir	ng
Time High (2)	1	Time High (2)	1
Time Low (2)	3	Time Low (2)	3
RMS Vel IPS (2)	5	RMS Vel IPS (2)	5
Peak Vel IPS (2)	7	Peak Vel IPS (2)	7
RMS Accel g (2)	9	RMS Accel g (2)	9
Peak Accel g (2)	11	Peak Accel g (2)	11
True Peak Accel g (2)	13	True Peak Accel g (2)	13
Crest Factor (2)	15	Crest Factor (2)	15
Battery Status (1)	17	Battery Status (1)	17
RF Status (1)	18	RF Status (1)	18
View Register M	ар	Assign Register	S
Remove Register Assig	gnments	Find Available Regi	sters
View Modbus Server	r Data	Starting after : 0	

Figure 14 – Modbus Configuration Screen – Sensor Mapping Method

The following tables explain the how the registers are mapped to the sensors and how to interpret the data that is returned.

Discrete Input		Sensor ID		Date Time	RMS Vel	Peak Vel	RMS Accel	Peak Accel	True Peak	CF	Status Bat RF
(R)	,	1		8b	4b	4b	4b	4b	4b	4b	2b
Coils (RAV)		2			3	6	S.	5	3	3	6
Input Registers (R)		32767 32768	-								
Holding Registers (R <i>W</i>)		65534 65535			3) 3) 31	3 3		2 2 3			2 5 2

Most Recent Transmission Data

Read Input Register Request

Red	quest	Respon	se	
Function	4	Function	4	
Start Addr Hi	Sensor Id-1 MSB	Byte Count	34	
Start Addr Lo	Sensor Id-1 LSB	Data Byte 1	nn	
Quantity Hi	0			
Quantity Lo	34	Data Byte 34	nn	

Figure 15 – Modbus Sensor Mapping Method Request/Response Diagram

4.1.5.2.1 Echo® Modbus Sensor Mapping Method Response Translation

The following table shows how the Modbus client software must translate the 34 byte Echo[®] data response to see it in a meaningful form.

Field	Bytes	Cast	Interpretation or Units
Transmission data	0-7	64-bit IEEE double-precision	Number of seconds since
and time		format	12:00:00.000 AM 1/1/1904
			(Universal Time)
RMS Velocity	8-11	32-bit IEEE single-precision	IPS or mm/s
		format	
Peak Velocity	12-15	32-bit IEEE single-precision	IPS or mm/s
		format	
RMS Acceleration	16-19	32-bit IEEE single-precision	g or m/s ²
		format	
Peak Acceleration	20-23	32-bit IEEE single-precision	g or m/s ²
		format	
True Peak	24-27	32-bit IEEE single-precision	g or m/s ²
Acceleration		format	
Crest Factor	28-31	32-bit IEEE single-precision	True Peak Accel / RMS Accel
		format	

Model 600A20, Manual #64448, Rev. C, ECO 50405

Battery Status	32	8-bit unsigned integer	0-3; 3=best quality
RF Status	33	8-bit unsigned integer	0-3; 3=best quality
		~	

Figure 16 – Modbus Sensor Mapping Method Response Translation Table

4.2 Echo® Data Presentation Software

The **Echo[®] Data Presentation** software is run by selecting Start | All Programs | PCB Echo Monitoring Software | Echo Data Presentation. Or running the Echo Monitoring.exe program located in the C:\PCB\Echo directory. This application is only applicable if the Echo[®] Data Service was configured for SQL Database operations since it presents the data and determines status based on information stored in the database.

The Echo[®] Data Presentation Software is used to view:

- Trend data collected from the receivers
- Status of the machines being monitored.
- Status of the sensors sending data to the receivers

When the Echo[®] Data Presentation software is run the screen shown in Figure 18 will appear. This screen can be resized by dragging the bottom right corner in or out. On the left is a list of sensors in a tree structure, organized by Plant | Group | Machine and Sensor Location (these terms are user configurable) from values entered in the sensors channel definition.

4.2.1 Echo[®] Main Screen Graphs

Clicking on a sensor in the left panel will cause its data, for each data type, to be displayed in the graphs located on the right panel. These graphs display trend data along with their associated critical and warning alarm levels. The screen can be used to view 6 graphs, one for each data type, or it can be used to zoom in on a particular data types. The data can be viewed in either English (ips & g's) or Metric (mm/s & m/s²) units.

When all six graphs are displayed their data can be scaled simultaneously by using the scale tool of the True Peak Acceleration graph in the bottom left of the screen 2. When scaled using this tool the data period will remain scaled to these dates until either the 'Reset Graph' option is selected from the menu options that appear by right clicking the graph or changing the display period from the Display Preferences screen (Figure 56). To enable or disable the 'Link' feature check or uncheck the menu bar item **Display** | **Main Screen Graphs** | **Link Graph Scales to True Peak Accel**.

РČв	Echo® Data	Presentat	ion Software						
Cor	nfiguration	Display	Receiver Utilities	System	m View	Tools	Administration	Help	
	25 Sensors	Data	Display Preferences.						
	Plant Area	Main	Screen Graphs	•	Displ		•		
	Dust Collection				Displ		Ctrl+A		
	🖃 B		ust Collect		Zoor		•		
			DC D201		🗸 Link	Accel	N		
			or OB Brg. 1H or OB Brg. 1V				Display		Ctrl+N
	Figure	DCD	Echo® Data Draca	ntatio	n Main (Famoon	Link granh goo	ling P.	011100 Mg

0.0



When enabled the True Peak Acceleration graph label will be blue, when disabled the label will be black. Additionally, the cursors on all other graphs can be moved by moving the True Peak Acceleration graph cursor when this feature is enabled.

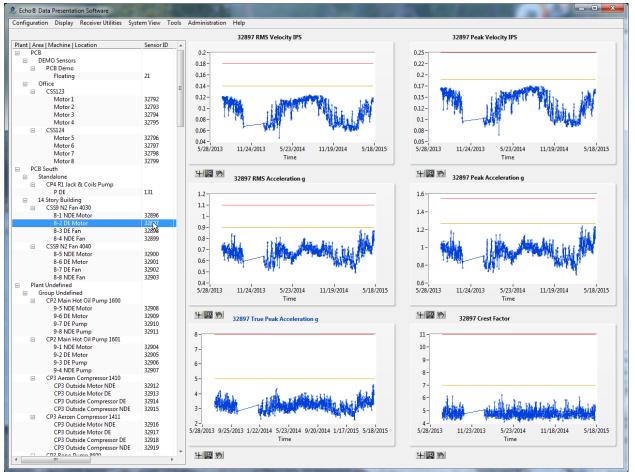
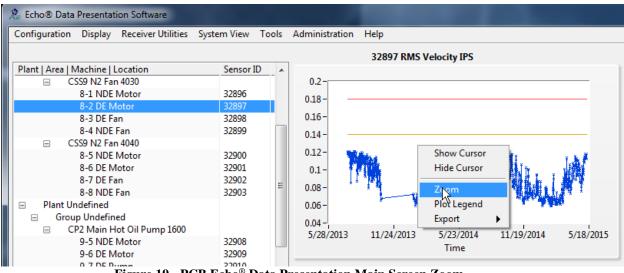


Figure 18 - PCB Echo® Data Presentation Main Screen

If the operator preference is to see a particular data type in an enlarged graph then rightclick on the graph, as shown in Figure 19, and select the Zoom option.



Echo[®] Monitoring Software User's Manual

Figure 19 - PCB Echo[®] Data Presentation Main Screen Zoom

This will cause the main screen to appear as shown in Figure 20. This action can also be accomplished using the menu bar items shown in Figure 21 (or <ctrl> 1 through 6).

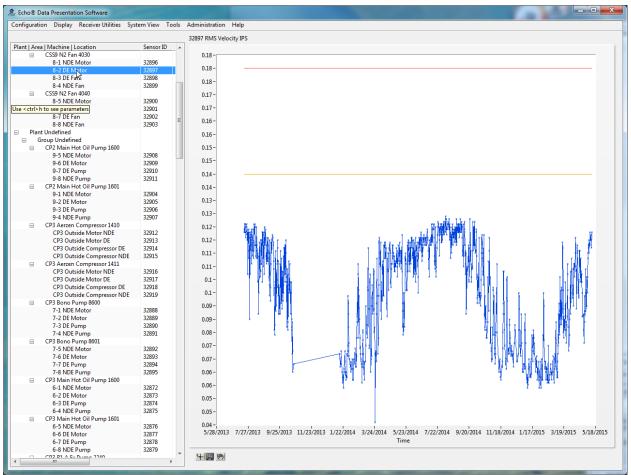


Figure 20 - PCB Echo® Data Presentation Main Screen with enlarged graph

🛃 Echo® Data	Presentat	ion Software	100											
Configuration	Display	Receiver Utilities	Syster	m View	Tools	Admin	istration	Help						
	Data Display Preferences									_		10	RMS Vel	ocity IPS
Plant Area I	Main	Screen Graphs		Displa	ay Perio	d				•	16-			
	P4 Main H	Hot Oil Pump 1600		Displa	ay All Gr	raphs			Ctrl+A					
	5-1 NDE			Zoom						•	RMS Ve	locity		Ctrl+1
	5-2 DE N	/lotor		🗸 Link 🤆	Graph So	cales to	True Peal	k Accel			Peak Ve	locity	К	Ctrl+2
	5-3 DE P	ump	L	32866	2						RMS Ac	celerati	on	Ctrl+3
	5-4 NDE	Pump		32867	2						Peak Ac	celelera	tion	Ctrl+4
🗆 C	P4 Main H	Hot Oil Pump 1601							-	6	True Per	ak Acce	leleration	Ctrl+5
	5-5 NDE	Motor		32868	2				E				referation	
	5-6 DE N	/lotor		32869	2						Crest Fa	ctor		Ctrl+6

Figure 21 - PCB Echo® Data Presentation Main Screen Menu bar Zoom options

To return to the six graph display, right click on the enlarged graph and click the 'Display All Graphs' option (or $\langle ctrl \rangle A$).

4.2.2 Echo[®] Main Screen Graph Cursors

Cursors can be displayed on the main screen graphs to track and display information about individual data points displayed in the graph. They can be displayed individually by selecting **Show Cursor** from the shortcut menu displayed when you right click on any graph. Once displayed, move the mouse cursor over the graph cursor and press the left mouse button to grab the graph cursor so it can be moved to the desired data point. In the example below the True Peak Acceleration graph is displayed. Notice its label is colored blue. This is because collective scaling is enabled and scaling the data on this graph, or displaying its cursor, or moving its cursor, will cause the same action to occur on all graphs. When a cursor is displayed a label will also display showing the x (date & Time) and y (magnitude) axis values for the selected data point.

To remove the cursor from the graph, select the **Hide Cursor** option from the short cut options.

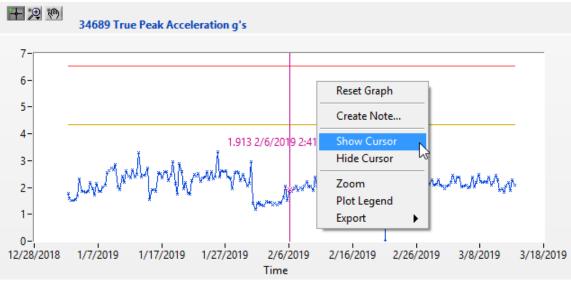


Figure 22 - PCB Echo® Data Presentation Main Screen Show Cursor option enabled

Figure 23 below shows the screen with the cursors enabled on all graphs and tied to the True Peak Acceleration graph actions.

Note: While the True Peak Acceleration graph movements will be reflected on the other graphs while in this state, the other graphs can be manipulated individually (scaled, cursor moved etc.) without affecting the other 5 graphs.



Figure 23 - PCB Echo® Data Presentation Main Screen with tracking cursors

4.2.3 Echo[®] Main Screen Status Updates

Initially status updates are disabled on the main screen and the sensors in the sensor tree will not show status colors. Generally the main screen is not the optimal screen to view status as it doesn't convey enough overall system information to determine how many monitored points need attention. For this 'at-a-glance' function the Echo[®] System Overview screen is recommended, preferably on a separate monitor.

However, status may be viewed on the main screen by setting the **Main Screen Refresh Rate** to a value greater than 0 on the **Display Preferences Dialog** screen, Figure 24, (Display | Display Data Preferences... from on the Main screen menu bar). This interval, in minutes, sets the update rate which also enables the status information to be displayed.

When status indications are enabled the sensor Id in the left panel will have one of five colors assigned to it;

- Green there are **No active alarms** for any data type being reported by the sensor.
- Yellow there is a Warning level alarm for one or more any data type being reported by the sensor.
- Red there is a Critical level alarm for one or more any data type being reported by the sensor.
- Gray No data has been collected for this sensor yet but alarms are enabled.
- White Alarms for the sensor are disabled.

Additionally the number of sensors in alarm will be displayed in red at the top of the sensor tree and. if context help is displayed <Ctrl-h>, a list of sensors in alarm will be displayed (Figure 25) when the cursor is on the sensor tree.

ree Hierarchy Tier Labels	Main Screen Items
Tier 1 Label Plant	Main Screen Refresh Rate In Minutes 20 Period of data to display in Main screen graph All
Tier 2 Label Area	Custom Start Time Custom Stop Time 12:08:13.034 PM 12:08:20.387 PM 11/8/2016 12/1/2016
Tier 3 Label Machine	Status Screen Items
Tier 4 Label Location	Echo System Overview Monitor 1
	Echo System Overview Paging Rate 15 Seconds
	Status Screen DB Refresh Rate 10 Minutes

Figure 24 – PCB Echo[®] Data Display Preferences Screen

To quickly view the alarm levels and other configuration information for a sensor enable the context help window (Help| Show context Help or <ctrl h>) and click on a sensors graph. To see a list of the sensors in alarm move the cursor over the sensor tree. Figure 26 shows the Main screen with status indications enabled and the context help window displayed.

Echo[®] Monitoring Software User's Manual

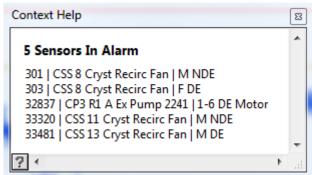


Figure 25 - Context Help window when cursor is on the Sensor Tree

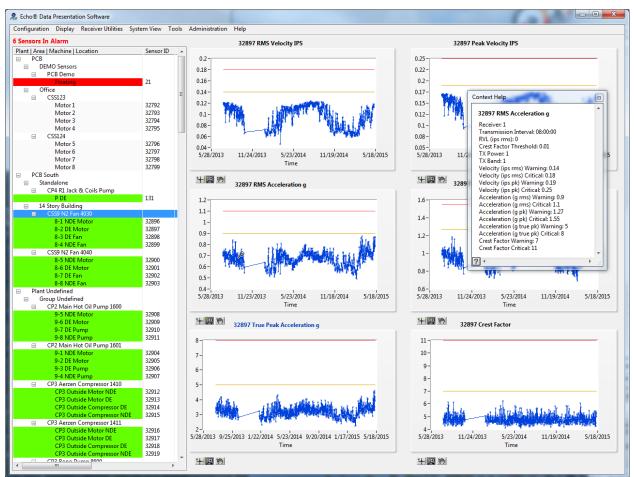


Figure 26 – PCB Echo[®] Main Screen showing status indications

Other functions can be accessed quickly by clicking on a sensor to select it and then right-clicking the mouse to display the list's shortcut menu (Figure 27).

Office Area				
 1st Floor Chill H20 Pump (A) 				
Chill Water Pump 1H	33518	9	Late	No A
Chill Water Pump 2H	33519	9	Late	No A
 1st Floor Supply Fan (A) 				
Motor OB Brg. 1H	33512	9	Late	No A
Motor OB Brg. 1V	33513	9	Late	No A
Motor IB Brg. 2H	33514	9	Late	No A
Motor IR Bro. 21/	22515	9	Late	No A
Fan IE Refresh Sensor List		Ð	Late	No A
Fan O Onen All Items		- 9	Late	No A
Open All Items				
Moto Close All Items		Ð	Late	No A
Moto Sort Ascending		Ð	Late	No A
E 2nd Floo Sort Descending				
Moto		_ <u>b</u>	Late	No 4
Moto Alarms	Þ	View A	larms	
Moto View History		Clear t	his Sensor's A	larms
Moto Advanced Plot		9	Late	No A
Fan IE View Channel Notes		Ð	Late	No A
Fan IE		_ 9	Late	No A
Fan O View/Edit Channel Setti	ngs	Ð	Late	No A
Fan O Determine Alarm Levels	-	9	Late	No A
2nd Floo Check Transmission Rel				
Cafe Sup	ability	-		
Wrapping A Delete this Channel				
Figure 27 – Main Screen Ser	sor Tree S	hort Cut M	enii	

Figure 27 – Main Screen Sensor Tree Short Cut Menu

From this short cut list you can;

- Refresh the sensor list to see if and changes have occurred.
- Sort the tree or a section of the tree in ascending or descending order.
- View the Alarm screen for the selected sensor (Figure 125).
- Clear the selected sensor's alarms.
- View the History screen for the selected sensor (Figure 104).
- Display the Advanced Plot window to better view the data (Figure 109).
- View, or edit, Channel Notes that have been assigned. (Figure 63)
- View or Edit the sensors parameters (Figure 36). (Editing them requires the user to be logged in Administration | Login...)
- Run the Alarm Level utility for the selected channel.
- Run the Transmission Reliability Utility for the selected channel.
- Delete the selected channel (This function also requires the user to be logged in)

It is recommended that the sensors be configured and added to the database, prior to the receiver connection so that their transmissions will be logged in the database.

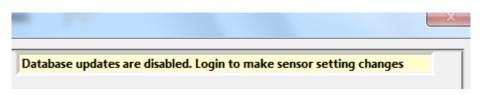
4.2.4 Echo[®] Configuration Administration Privilege

To add or edit a sensor's configuration parameters you must be logged into the Echo[®] Software. This screen is shown immediately when the software is started. At other times to log in select **Administration** | **Login...**, from the main screen menu bar. This will bring up the Login Dialog window shown in Figure 28. Passwords are case sensitive. If the software is being run for the first time the password is blank. Just click OK to log in. Once logged in you can select Administration | Change Password... to set a new password.

Re	Password Validation Dialog	X
	Enter the Password	
	OK Cancel	

Figure 28 – Administration Log in Dialog window

If you are not logged in and you open window where configuration changes are made you will see a message similar to the one below displayed on the screen. Additionally, some menu options may be disabled.



4.2.5 Echo[®] Receiver Configuration

To configure the Echo[®] Software for data collection or data viewing click on the Configuration | Receivers... item as shown.

Echo[®] Monitoring Software User's Manual

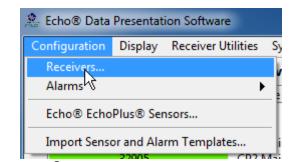


Figure 29 – Echo[®] Monitoring Receiver Configuration Menu Option

Selecting the Configuration | Receivers... option will bring up the screen shown in Figure 8. This window allows you to enter the parameters necessary to monitor a receiver, enable or disable the SQL interface After any configuration changes are made they must be saved and the service must be stopped and restarted for them to take effect.

4.2.5.1 Receivers Tab

Receiver Parameters – Use this function to configure Echo[®] receivers, if it becomes necessary to remove a configured receiver from the system, right-click on the list and select the delete option.

- **Receiver Name** Enter any name you like to refer to the receiver.
- **IP address** Enter the IP address assigned to the receiver. You can use the Find utility described below to determine this.
- **SQL Server UDL File Path** Enter the UDL or DSN file path that defines what database the transmissions should go to. This is required if SQL DB Enable is checked.
 - **SQL DB Enable** Check this box to have the Echo[®] transmissions stored in the database.

Note: the Modbus parameters are never presented in the Echo[®] Data Presentation Software since it is not applicable here. See the Echo[®] Data Monitor Service for a description of the Modbus interface and configuration.

4.2.6 Echo[®] Sensor Configuration

It is important that the sensors be configured properly so they:

- Send data at the appropriate interval and within the proper frequency band.
- Get registered in the database allowing data received from them to be stored.
- Can be referenced in terms that make more sense than the ID number they are manufactured with.

The Echo[®] Monitoring Software provides a screen for this purpose which can be accessed through the 'Add Echo[®] or EchoPlus[®] Sensors...' item on the main screen menu bar shown below in Figure 30.

Echo[®] Monitoring Software User's Manual

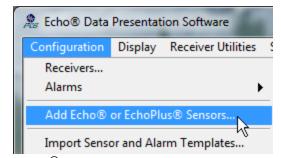


Figure 30 – Echo[®] Monitoring Sensor Configuration Menu Option

Selecting **Configuration** | **Add Echo[®] EchoPlus[®] Sensors...** will bring up a dialog screen to add a sensor or junction box to the database (Figure 31). Enter the Sensor Id of a 670A01 standalone Echo[®] sensor or the 1st channel id of a 672A01 EchoPlus[®] junction box and click the Add button.

Add a New Echo Sensor to the Database	x
Please enter the Sensor Id of the new Echo Sensor. If an EchoPlus junction box is being added, enter the Sensor Id of the 1st channel.	
Sensor Id	
Add Cancel	

Figure 31 – Echo[®] add sensor dialog

If the Sensor Id entered is not already defined in the database then an information dialog will appear stating that fact and defaults will be used for its parameters.

Clicking OK on the dialog box will display the Echo[®] Sensor Parameter Editor screen shown in Figure 32 or Figure 36. If the Sensor Id is less than 32768 then the sensor is a standalone 670A01 Echo[®] sensor. In this case the single channel dialog is displayed.

Echo [®]	Monitoring	Software	User's	Manual
LUIO		Doremare		1, 1, 6, 61, 61, 66, 64, 64, 64, 64, 64, 64, 64, 64, 64

Plant PCB Disable	
	-
Area CA Velocity (ips rms) Warning 0.16	
Machine Demo Sensor Velocity (ips rms) Critical 0.22	
Velocity (ips pk) Warning 0.22	
Velocity (ips pk) Critical 0.31	
Acceleration (g rms) Warning 0.40 Sensor Id 25 Model Number 672A01	
Acceleration (g rms) Critical 0.60	
Receiver Assignment 1 Sensitivity (mV/g) 100.00 Acceleration (g pk) Warning 0.56	
**Transmission Interval 08:00:00 Missed Transmission Count 3 Acceleration (g pk) Critical 0.84	
**RVL(ips rms) 0.00 Ignore Alarm Events Count 0 Acceleration (g true pk) Warning 1.80	
Acceleration (g true pk) Critical 2.20	
Crest Factor Warning 8.00	
**Transmission Band 1 🔽 Critical Alarm Email List Disable 🔍 Crest Factor Critical 10.00	
**CF Report Threshold 0.01 Max Transmissions to Store Unlimited Acceleration (g true pk) Critical 2.20 **Transmission Power High Warning Alarm Email List Disable Crest Factor Warning 8.00	

Figure 32 – 670A01 Echo[®] Sensor Parameter Editor Screen

When adding channels to the database the 1st action should be to connect to the device, if possible, configure its parameters and then finish with the other parameters on the editor screen. This sequence will synchronize the settings in the sensor with their database counterparts automatically. This method provides the best assurance that what is subsequently seen in a sensors database fields accurately reflects the actual sensor configuration. However, if it is not convenient to connect to the sensor then, at a minimum, you must set up the data base fields manually so the sensors transmissions will be recorded.

To connect to a device select the 'Echo Device | Connect...' item in the menu bar.

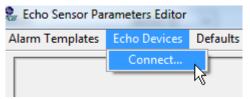


Figure 33 – Echo[®] Connection Menu item

Selecting 'Connect...' will cause the appropriate device configuration screen to be displayed. Before proceeding though you must connect the appropriate serial port cable to the sensor. For the Echo[®] sensor the cable is a DB9 to mini-USB. For EchoPlus[®] it is a standard, straight through, serial cable with DB9 connectors on each end. For Echo[®] sensors the screen shown in Figure 34 will appear, for EchoPlus[®] the screen in Figure 40 (Section 4.2.6.4) will appear.

4.2.6.1 Echo® Sensor Hardware Configuration Utility

The Echo[®] Configuration Utility provides a mechanism to read and write the sensor parameters. Typically the only parameters that would require modification are the Transmission Interval, the Residual Vibration Level (RVL), the Transmission Power and the Transmission Band. The Sensor ID is set at the factory and must not be changed.

To connect, click on the 'Link to Echo[®]' button. If the sensor is active (the magnetic switch is activated and the small LED blinks every 4 seconds¹) then you should only click the button when the sensor is not taking a measurement or transmitting otherwise a communication error may occur. A sensor is taking a measurement if the blue LED is dimly lit continuously for several seconds and it is transmitting if the LED is brightly lit for several seconds.

When the link is successful the green LED on the screen will be bright and after several seconds the sensor parameters will appear in the fields as in Figure 35.

Access Level	Sensor Configuration Parameters		
Echo Sensor User 🧹	Sensor ID	0	
	Transmission Interval (hh:mm:ss)	00:00:00	Set
K COM1	RVL (ips rms)	0	Set
Link to Echo®	CF Report Threshold (g rms)	0	Set
	Transmission Power	High 🗸	Set
Read Parameters	Transmission Band	1	Set

Figure 34 – Echo[®] Configuration Utility

The **Transmission Interval** determines how often the sensor wakes up to take a reading and transmit². The format is HH:MM:SS with a resolution is 4 seconds. If you set a value that is not a factor of 4 seconds the utility will automatically adjust it to be one (ex: if you set it to 30 seconds it will change it to 28 seconds and display 28 after the sensor is updated). For 868MHz systems there is a minimum transmission interval of 7.5 minutes (1% duty cycle for a 4.5 second RF transmission). There is no minimum for 916 MHz systems.

¹ The sensor is not active if the LED blinks at 8 second intervals. You may connect to it when it is inactive

 $^{^2}$ This setting directly affects the battery life. Transmitting every 32 seconds will drain the battery quickly. Transmitting every 8 hours and the battery should last ~ 1year.

Residual Vibration Level (RVL) it the minimum IPS RMS level the sensor must detect before transmitting the data. If this value is 0 the sensor will transmit every reading.

The **Crest Factor Report Threshold** is an RMS acceleration value. If the measured RMS acceleration is less than this value, a zero is reported for the Crest Factor. If it is equal to or greater than the threshold value, the actual Crest Factor is reported. This feature exists because there is 2 kHz HP filter in the acceleration circuit. If there isn't any HF in the signal, the RMS acceleration data will essentially be noise and thus the CF will be invalid.

The **Transmission Power** for a sensor can be set to High (normal) or Low. Typically this will be set to High. If the sensor is close to the receiver then Low should be selected.

The **Transmission Band** setting (1-12 for 619MHz systems or 1-9 for 868MHz EU systems) must be coordinated with the receiver since only transmissions in a specific band will be recognized by a receiver. This feature is useful in situations where multiple receivers are present since you only want one receiver processing each sensor.

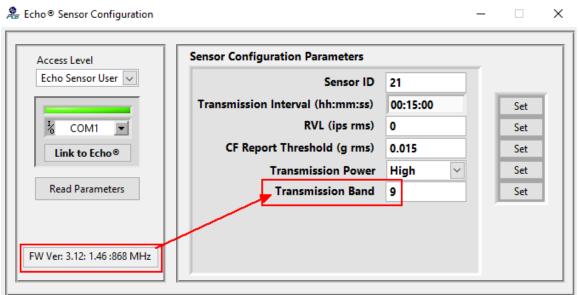


Figure 35 – Echo[®] Configuration Utility Connected

When the sensor configuration is complete you can close the utility by clicking the 'X' in the top right corner of the screen.

Several database fields will be filled in initially for a new sensor that has just been configured with the utility. These are the Sensor ID through the Sensitivity fields. *These should NOT be changed*. Next enter the rest of the channel parameters as described below.

Plant	PCB				Alarm Ty	rpe Disable 💌
Area	CA				Velocity (ips rms) Wa	rning 0.16
Machine	Demo Sens	or			Velocity (ips rms) C	
Location	Various				Velocity (ips pk) Wa	rning 0.22
					Velocity (ips pk) C	ritical 0.31
	Sensor Id	25	Model Number	672A01	Acceleration (g rms) Wa	
Receiver A	Assignment		Sensitivity (mV/q)		Acceleration (g rms) C	
**Transmiss	-	08:00:00	Missed Transmission Count		Acceleration (g pk) Wa	
	VL(ips rms)	-	Ignore Alarm Events Count		Acceleration (g pk) C	
	t Threshold		Max Transmissions to Store Ur		Acceleration (g true pk) Wa	
	sion Power		Warning Alarm Email List Di		Acceleration (g true pk) C	
	ission Band		Critical Alarm Email List Di		Crest Factor Wa	
					Crest Factor C	ritical 10.00

4.2.6.2 Echo[®] Sensor Database Parameters

Figure 36 – Echo[®] Sensor Parameter Editor

The **Plant**, **Area**, **Machine**, **Location** and the **Alarm** fields will automatically be populated with the values of the previous sensor's data since many sensors will have similar values and this makes the data entry task easier. The Echo[®] Monitoring software uses this information to determine if an alert should be issued and to better identify a sensor using the machine and location values whenever a sensor is referenced or selected.

The **Plant**, **Area**, **Machine**, **Location** fields are used to organize sensors in the tree structures on the Main and Alarm screens. If no Plant or Area value is entered then the sensor will be put in the Plant Undefined or Group Undefined section.

To aid in the task of entering alarm levels there is a menu item to automatically fill the alarm values in by selecting then from an alarm template. To use this feature click on the Alarm Templates Menu item (shown below) and select the appropriate alarm template option. These templates can be set up by the end user to suit their needs. The process is described in section 4.2.9.

NOTE: To disable a specific measurements ability to trigger an alarm, set its alarm level to 0.

Alarm Templates Echo Devices Defaults Fan Intake Fan IF Motor OFB Blower Heater Packing Machine Mark	🧏 Echo Sensor Par	amete	rs Editor		
Intake Fan IF Motor OFB Blower Heater Packing Machine Mark	Alarm Templates	Echo	Devices	Defaults	
IF Motor OFB Blower Heater Packing Machine Mark	Fan				_
OFB Blower Plant PCB Heater Packing Machine Area DEMO	Intake Fan				
Blower Blant PCB Heater Packing Machine Area DEMO	IF Motor		_		
Heater Packing Machine Area DEMO					
Packing Machine Area DEMO	Blower	3	PI	ant PCB	
Mark	Heater				
Mark	Packing Machin	ie 🛛	A	rea DEM	0
Machine PCB D	Mark		Mach	ine PCB	٦e
Cooler	Cooler		Wach	He FCD	De
Jack Location Floatin	Jack		Locat	ion Float	in

Figure 37 – Set alarm values from a template

Additional channel parameters are;

- Alarm Type Disable; Latch, meaning hold the alarm until the operator clears it; Non-Latch the alarm will go away if the next transmission does not exceed the alarm threshold.
- Missed Transmission Count This is the number of missed transmissions that can be tolerated before a Late Data alarm is declared.
- Max Transmissions to Store This is the number of readings to keep in the database for this sensor, when the number of readings stored exceeds this number the oldest readings are deleted automatically. To keep all readings select 'Unlimited'. Any transmission can be saved indefinitely if desired by setting the Save Flag from the Historical Data | Maintenance screen, see section 4.2.14.5.1
- **Ignore Alarm Events Count** An alarm level must be exceeded this number of <u>consecutive</u> times before an alarm is declared on a channel with an alarm type set to 'Latch'. Set the count to 0 to disable this feature and declare an alarm for every reading that exceeds the set alarm level if alarms are enabled. If consecutive alarm events occur and the alarm is set then each subsequent alarm will also trigger an alarm until the alarm is cleared.
 - NOTE: by setting Ignore Alarm Events Count to a value other than 0 the user acknowledges that alarm status and email notifications will be delayed, in some cases for a significant period of time, especially if the transmission reliability for a particular sensor is not good.
- Alarm Type
 - **Disable** no alarms are generated for this sensor.
 - Latch hold the alarm until the operator clears it.
 - Non-Latch the alarm will go away if a subsequent transmission does not exceed the alarm threshold
- Warning and Critical Alarm Email Lists These pull down controls select the email list associated with warning and critical alarms for this sensor. If alarms are enabled and a list is selected then, when an alarm occurs for the sensor, whoever is in the list will get an email with the alarm details.

After all these fields are entered click on the **OK** button to complete the process. The dialog box in Figure 38 will be displayed.

Re	X
	Database Updated!
	K
	@

Figure 38 – Echo[®] Database Update Complete Dialog

Clicking **Cancel** discards any changes made to the sensor database parameters.

4.2.6.3 EchoPlus[®] Sensor Database Parameters

If the device being added is a 672A01 EchoPlus[®] device then the screen that appears is similar to the 670A01 but it has features to quickly configure multiple channels.

Figure 39 – EchoPlus[®] Sensor Parameter Editor

Next to most items is a check box. Click (check) this box if you want that parameter applied to more than the selected channel. You can also click the **Toggle Settings** button to set or clear all setting checkboxes. Next click the **Toggle Channels** button to select, or clear, all channels, or individually select the channels to apply the parameters to by clicking the channel check boxes at the bottom of the screen. When the parameters are set and the check boxes are checked click on the **Update** button to apply the settings. **Note**: the Update button only appears when more than 1 channel is selected.

To cycle through the channels click the left or right arrow buttons. These navigate through the channels and display the channels parameters. When all parameters are set appropriately click **OK** to close the window and write the settings to the database. Alternately, to cancel and changes, click the **Cancel** button.

The menu bar has two quick setting items to set the alarms for the displayed channel from the **Alarm Templates** or to set the parameters to their **Default** values. It also has an **Echo Devices** entry to access the junction box or standalone sensor configuration windows. **Note**: the **Echo Devices** function requires you to connect to the physical hardware with the appropriate serial cable. **Note**: The Sensor ID for junction boxes is always in groups of 8 starting with the id 32768. The editor will make sure this convention is followed. The 1st channel will always be set to an 8 channel multiple and next 7 will increment from it. Additionally, the **Transmission Power** (High/Low) and **Transmission Band** (1-12 for 619MHz systems or 1-9 for 868MHz EU systems) values apply to all channels in the junction box. Whenever they are changed, that settings will be applied to all channels no matter which channel of the junction box is displayed when they are changed.

4.2.6.4 EchoPlus[®] Sensor Device Configuration Utility

The EchoPlus[®] Device Configuration Utility provides a mechanism to read and write the sensor parameters for all of the channels in an EchoPlus[®] junction box. These values are saved on and used by the hardware itself. It is similar to the Echo[®] Configuration Utility except it works with multiple channels and provides a calibration capability to fine tune the data transmitted for the sensors connected to it which, unlike the single channel 670A01, can have different sensitivity sensors connected to it. As with the Echo[®] Sensors, the only parameters that would require modification are the Transmission Interval, the Residual Vibration Level (RVL) and the Crest Factor Threshold. The Calibration utility available on the menu bar should be used to change the channel gain for acceleration and velocity. The Sensor ID is set at the factory and must not be changed. See section **4.2.6.1** for a detailed description of these parameters.

To connect, click on the 'Link to EchoPlus[®]' button as shown in Figure 40 below. If the junction box is not transmitting this connection will cause all 8 blue LEDS in the box to light and stay lit until the cable is disconnected. When in this state the box will not transmit data.

on Advanced										
	EchoPlus® Configuration Parar	neters	,							
				_	DS	SP Multisa	nple Acqu	isition Par	ameters	
Access Level	Transmission Int	erval	00:00:00	(hh:mm	n:ss)	Retry Dela	y (secs) 1	20 Maxi	mum Sam	ples 3
	Transmission P	ower	Low	•		-	Veloci	ty Acce	leration C	rest Factor
	Transmission	Band	0		1	olerances	(%) 50	▼ 50	-	50 💌
	Senso	or ID	0	0	0	0	0	0	0	0
Link to EchoPlus®	RVL (ips rms)	>>>	0	0	0	0	0	0	0	0
	CF Report Threshold (g rms)	>>>	0	0	0	0	0	0	0	0
Read Parameters	Acceleration Gain	>>>	0	0	0	0	0	0	0	0
	Velocity Gain	>>>	0	0	0	0	0	0	0	0
Transmit Test	DSP Blocks	>>>	0	0	0	0	0	0	0	0
	DSP Multisample Acquisition	>>>	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	Sensor Status	>>>	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
FW Version: 3.05	Configure Sensor	>>>	Update	Update	Update	Update	Update	Update	Update	Update

Figure 40 – EchoPlus® Configuration Utility

Once connected the software will read the settings from the junction box and display them on the screen. An example of this is shown in Figure 41.

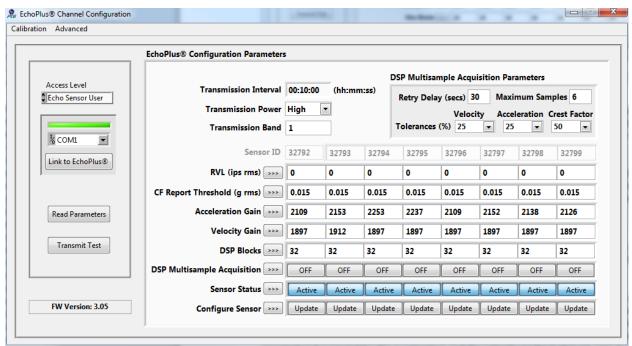


Figure 41 – EchoPlus[®] Configuration Utility Connected

The parameters are listed top to bottom on the left with each column representing a channel's settings. Most channel parameters can be set individually except for Transmission Interval, Band, Power and the Multi Sample Acquisition Parameters. These are unit parameters. All enabled channels will transmit data at this interval, power level and band if they meet the RVL criteria. The Multi Sample Acquisition Parameters are implemented for a channel if that channel has Multi Sample Acquisition set to Active. Otherwise the normal data acquisition algorithm is used. See section 4.2.6.4.2.

Note the column of buttons on the left with the '>>>' designation. These facilitate setting all channels to the same value as channel 1 for the associated parameter. To accomplish this task set a value in channel 1 for the parameter of interest and then click on its '>>>' button to set that parameter for all channels.

4.2.6.4.1 Minimum Transmission Interval

916 MHz Systems – None

868 MHz systems (EU) -1% Duty Cycle. Each transmission requires 4.5 seconds to complete. Therefore each channel must be inactive for 450 seconds after a transmission.

The following table defines the minimum transmission intervals for EchoPlus[®] junction boxes based on the number of channels in the unit that are active (enabled).

Active Channels	Minimum Transmission Schedule hr:min:sec (s)
1	0:07:30 (450)
2	0:15:00 (900)
3	0:22:30 (1350)
4	0:30:00 (1800)
5	0:37:30 (2250)
6	0:45:00 (2700)
7	0:52:30 (3150)
8	1:00:00 (3600)

	EchoPlus® Configuration Paramete	rs							
					DSP Multisar	nple Acqu	isition Par	ameters	
Access Level	Transmission Interva	00:10:00	(hh:mm		Retry Dela			mum Sam	nles 6
	Transmission Powe	r High	•		Retry Dela	Veloci			Crest Factor
	Transmission Band	1			Tolerances		25		50 💌
	Sensor ID	32792	32793	32794	32795	32796	32797	32798	32799
Link to EchoPlus®	RVL (ips rms)		0	0	0	0	0	0	0
,	CF Report Threshold (g rms)		0.015	0.015	0.015	0.015	0.015	0.015	0.015
	Acceleration Gain		2153	2253	2237	2109	2152	2138	2126
Read Parameters			-			1	-	-	-
Transmit Test	Velocity Gain		1912	1897	1897	1897	1897	1897	1897
	DSP Blocks	32	32	32	32	32	32	32	32
	DSP Multisample Acquisition	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	Sensor Status 🗪	Active	Active	Active	e Active	Active	Active	Active	Active
FW Version: 3.05	Configure Sensor	Update	Update	Updat	e Update	Update	Update	Update	Update

Figure 42 – EchoPlus[®] Configuration Utility Update

When all parameters for a channel are set, click on the **Update** button for that channel and the parameters will be sent to the channel. If a channel is not connected or the data is not collected then set the **Sensor Status** setting for that channel to the **OFF** setting and **Update** it. This will disable the channel. Note the red circled button above, activation of it will update all enabled channels rather than activating the individual channel **Update** buttons.

EchoPlus[®] channel numbers are always assigned at the factory and should never be changed. Additionally the ID numbers are always greater than or equal to 32768 and channel 1 will always be a multiple of 8 (examples of channel 1 IDs are 32768, 32776, 32784 etc..).

The **DSP Blocks** size parameter is unique to the junction box and can be set on a per channel basis. The Echo[®] Multichannel system acquires acceleration and velocity data in sample blocks over 0.328 seconds, consisting of 2048 samples of velocity data and 18432

samples of acceleration data. The DSP Blocks variable controls the number 0.328 second blocks that are acquired and averaged for the acceleration and the velocity readings that are sent back to the receiver. For any given reading, the first 7 blocks are used to set the analog gains for the sensor inputs; thus a setting of 16 results in an acquisition times of (16-7)*0.328 = 2.952 s, while a setting of 128 results in an acquisition time of (121)*0.3 s=39.688 s. This variable can be set individually for each channel so that a specific sensor can be sampled for a longer time period. Following is a table of total acquisition time required for several DSP Block size assignments. Note that there is some overhead time required for each channel so the total time is greater the acquisition time described above.

DSP Block	Time(s)
128	55
80	37
80	36
72	34
64	31
40	23
32	20
20	15.5
16	14

Figure 43 – EchoPlus[®] Total Acquisition Time per Channel Table

	EchoPlus® Configuration Paramet	ers							
					DSP Multisar	nple Acqu	isition Par	ameters	
Access Level	Transmission Interv	al 00:10:00	(hh:mm	n:ss)	Retry Dela	v (secs) 3	0 Maxi	mum Sam	ples 6
	Transmission Powe	er High [•			Veloci			Crest Factor
	Transmission Ban	d 1			Tolerances		- 25		50 💌
K COM1	Sensor I	D 32792	32793	32794	32795	32796	32797	32798	32799
Link to EchoPlus®	RVL (ips rms) 💿	> 0	0	0	0	0	0	0	0
	CF Report Threshold (g rms) 🗪	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Read Parameters	Acceleration Gain 🗪	> 2109	2153	2253	2237	2109	2152	2138	2126
	Velocity Gain 🗪	1897	1912	1897	1897	1897	1897	1897	1897
Transmit Test	DSP Blocks 🗪	> 32	32	32	32	32	32	32	32
	DSP Multisample Acquisition	> Active	Active	Active	Active	Active	Active	Active	Active
	Sensor Status 🗪	> Active	Active	Active	Active	Active	Active	Active	Active
FW Version: 3.05	Configure Sensor 🗪	> Update	Update	Update	e Update	Update	Update	Update	Update

Figure 44 – EchoPlus[®] Configuration Utility with Multi-Sample Acquisition Active

4.2.6.4.2 EchoPlus[®] Multi-Sample Acquisition Parameters

The Multi Sample Acquisition Parameters are used to implement a sophisticated data acquisition algorithm for industrial situations where transient noise may be present which could be picked up by a sensor or the cabling and interfere with the normal data acquisition that generates the velocity and acceleration readings. If the **Multi-sample**

Acquisition setting is turned on, the following process is followed in the junction box firmware. First, 3 initial readings are acquired by the microcontroller from the DSP and if the 3 readings are within the specified **Tolerance ranges** for velocity, acceleration and crest factor, then the last reading (reading number 3) is transmitted back to the receiver. If the first 3 readings are not within the tolerance range, then an additional (fourth) reading is acquired from the DSP and the most recent 3 readings (2, 3 & 4) are evaluated to be within the tolerance range. If so then the fourth reading is transmitted to the receiver. If not, then the process is repeated, up to the number of sample readings specified in the **Maximum Samples** setting (up to 10), looking for 3 successive readings within the specified tolerances. If 3 successive readings are not within the specified tolerances. If a successive readings are not within the specified tolerances. If a successive readings are not within the specified tolerances. If a successive readings are not within the specified tolerances. If a successive readings are not within the specified tolerances. If a successive readings are not within the specified tolerances. If a successive readings are not within the specified tolerances. The parameter definitions are as follows:

- **Multi-sample Acquisition Enable** (ON/OFF) Turns the multi-sample acquisition on or off for the specified channel. If multi-sample acquisition is OFF then a single reading is taken based on the DSP block size and transmitted without checking multiple samples for tolerance levels.
- **Maximum Samples** (3-10) Number of samples to take while looking for 3 consecutive readings that are within tolerance.
- **Retry Delay** (5-255 seconds) time to wait until the next acquisition attempt if the first pass of finding 3 consecutive readings within tolerance fails. This delay stops processing until it expires resulting in increased data collection time for the active transmission interval. Care should be taken to ensure the maximum possible time to acquire all enabled channels in the junction box does not exceed the **Transmission Interval** itself.
- Tolerance Percent's (50, 25, 12.5, 6.25, 3.125) These are the available selections, in percent, for determining if the 3 consecutive samples are close enough to declare a good reading has been acquired and can be transmitted to the receiver. They are individually set for Velocity, Acceleration and Crest Factor. Note: Crest Factor only allows selections of 50, 25 and 12.5.
- **Multi-sample processing results** the results of the multi-sample acquisition is provided by the **DSP Status** value transmitted with each channels data. The DSP Status can be viewed in the channels **History** table accessible from the **Echo Data Presentation Software** main screen. The values are as follows
 - $\mathbf{0}$ No error, the 1st 3 consecutive samples were found to be in tolerance (or Multi sample is turned off for the channel).
 - \circ **1** The transmitted data was out of tolerance in the 1st three sample comparison but was valid with subsequent sampling before the need to delay and retry.
 - 2-3 consecutive samples were found to be in tolerance on the 2nd pass after the retry delay.
 - \circ 3 3 consecutive samples were not found to be in tolerance.

4.2.6.4.3 EchoPlus[®] Sensor Calibration Utility

The calibration utility is included to improve the accuracy of the readings that are transmitted by the junction box. The initial gain settings of each channel assume that the attached sensor has a sensitivity of 100 mV/g. If the actual calibrated sensitivity is known or the sensor sensitivity has a different general rating such as 10, 50, or 500 mV/g then that can be adjusted for here.

EchoPlus® Channel Configuration	ion
Calibration	
Velocity Calibration	
Acceleration Calibration ゼ	EchoPlus® Configuration

Figure 45 – EchoPlus® Configuration Utility Menu Options

To access the calibration utility, select the appropriate signal type; Velocity (low band) or Acceleration (high band) from the Calibration menu. This will bring up the screen shown in Figure 46 below.

The screen layout has 6 columns and 8 rows. Each row represents a channel. The Columns are as follows

- Current Cal column shows the current value for the channel.
- Nominal Sensitivities column select the appropriate nominal sensitivity for the attached sensor
- Actual Sensitivity enter the sensors actual sensitivity from the calibration certificate here if it is known. If not make this the same as the nominal value.
- Calculate click on this button when the sensitivities are entered.
- New Cal this shows the new calculated calibration factor.
- Accept click to accept the value.

When all channel values are entered, close the window. The accepted values will be written to the junction box channel.

Echo[®] Monitoring Software User's Manual

Veloc	ity (Low Band)				
	Current Cal	Nominal Sensitivities	Actual Sensitivi (mV/g)	ty	New Cal	Accept
1	1935	100 mV/g 💌	\$100.3	Calculate	1929	
2	1916	100 mV/g 💌	100	Calculate	0	
3	1935	100 mV/g 💌	100	Calculate	0	
4	1976	100 mV/g 💌	100	Calculate	0	
5	1916	100 mV/g 💌	100	Calculate	0	
6	1824	100 mV/g 💌	100	Calculate	0	
7	1916	100 mV/g 💌	100	Calculate	0	
8	1935	100 mV/g 💌	100	Calculate	0	
		Select				
1) S 2) i i 3) A 4) (tructions: Select the nomi f you know the t in the 'Actual Activate the 'Ca Check the appr Exit from this se	50 mV/g ↓ ↓ 100 mV/g 0 500 mV/a		t) for the sen inal value. re entered. I 'accepted' w		

Figure 46 – EchoPlus[®] Configuration Utility Calibration Factor Calculator

4.2.7 Importing Echo[®] Sensor Configurations from Excel

If you have Microsoft Office 2010 Excel[®] then you can import the Echo[®] Sensor configurations and Alarm templates. The Echo[®] Data Presentation software installer will put an Excel spreadsheet file <u>Echo Sensor Import Template.xlsx</u> in the directory C:\PCB\Echo\Database. Open this file with Excel 2010 and enter sensor data in the **Sensor Definition** sheet and, if you have Alarm templates, enter them in the **Alarm Lists** sheet.

	17 - 6	× -							Micr	osoft Excel				
File	Home	e Insert	Page Layo	ut Formula	as Data Re	eview View	Add-Ins							
Ê	🔏 Cut		libri	- 11 A	A A = =	 &/-	Wrap Text	G	General	↓				× 📋
Paste	V Format	10	ΙŪ·	🗄 • 🍐 •	·▲·≣≡	≣ ≇ ≇	📲 Merge & Ce	nter - S	\$ ~ % , 50	Conditional Formatting			Insert De	lete Forma
	Clipboard	Gi -	F	ont	G.	Alignme	nt	- Gi	Number	- Fai	Styles		C	ells
	A2	• (f_x	21										
E		▼ (Import Temp B		21 D	E		F	G	Н	1	J	К	L	M
	cho Sensor I A	Import Temp	late.xlsx C	1	E Machine		Tran	G smission terval	•	Crest Factor Report Level	J Tx Power		L Model Number	
	cho Sensor I A	Import Temp B Receiver ID	late.xlsx C	D			Tran	smission terval	Residual	Report Level		Tx Band		

Figure 47 – Import Echo[®] Sensor Definitions from an Excel Spreadsheet

If you want to have a sensor's alarm levels set by an alarm template defined in the spreadsheet then enter the alarm templates number in the 'Alarm List' entry of the sensor definition. If an 'Alarm List' entry is not 0 then the alarm values are taken from the list. If the 'Alarm List' entry is 0 then the alarms come from the sensor

F	• ب	े - ६ र 👘				E	Echo Sensor Import Te	mplate.xlsx - Excel			
Fil	e Ho	ome Insert	Page Layout	Formulas Data	Review Vie	w ÇTellmewł	nat you want to do				
	Cut	La	libri • 11	- A A =	= - %	🚽 Wrap Text	General	-	🕎 🔛	🗄 🧏 🖷	AutoSum · A
Past	⊔ ि≞ Cop e ∛ Forr		I <u>U</u> • 🖽 •	<u>⊳ - A</u> - <u></u> ≡	= = • •	🚊 Merge & Center	- \$ - % > 9	Conditional	Format as Cell	Insert Delete Format	Fill → Sort i Clear → Filter
	Clipboar	nd ra	Font	r _{Si}	Alignme	ent	rs Number	-	Styles	Cells	Editing
A1		• : ×	√ f≈ List								
	A	в	с	D	E	F	G	н	I.	J	к
1	List	Name	RMS Velocity Warning Alarm	RMS Velocity Critical Alarm	Peak Velocity Warning Alarm	Peak Velocity Critical Alarm	RMS Accel Warning Alarm	RMS Accel Critical Alarm	Peak Accel Warning Alarm	Peak Accel Critical Alarm	True Peak Accel Warning Alarm
2	1	Big Fan	0.5	0.7	0.5	0.7	0.5	0.7	0.5	0.7	0.5
			Figure 49	8 _ Impo	rt Fcho $^{\mathbb{R}}$	Alarm To	mnlates f	rom an F	vcel Snrea	dsheet	

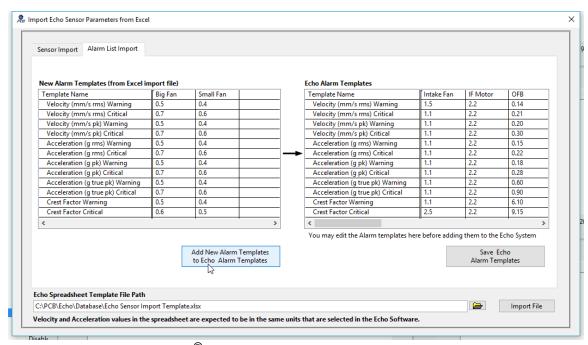
Figure 48 – Import Echo[®] Alarm Templates from an Excel Spreadsheet

To import the speradsheet settings to the Echo[®] database select Configuration | Import Sensor and Alarm Templates... from the main menu. This will cause the following screen to appear. At the bottom of the screen select the location of the excel file and click the Import File button. This reads the excel data into the screen. At this point nothing has been added of the Echo[®] database.

sor Import	Alarm List Import						
Sensor Table							
Sensor Id	Receiver ID	Plant	Group	Machine	Location	Transmission Interval	Residual Vibration Level (RMS Velocity)
2	1	Main	GF1	PCB Fanbig	MNDE	08:00:00	0
5	2	Main	GF2	PCB Fansmall	MNDE	08:00:00	0
7							
Current Echo	Unit Settings					р	rompt for each Sensor 🗹
							-
Velocity Metric	: 🗸 mm/s Acce	leration English	✓ g			U	pdate Echo Database

Figure 49 – Echo[®] Import Sensor Definitions from Excel Dialog screen To import the sensor definitions click the **Update Echo Database** button. If you want to select which sensors are added the check the **Prompt for each Sensor** box.

Indicators at the bottom of the screen (red box above) show the current Echo software unit selections for velocity and acceleration readings. The spreadsheet alarm values **MUST** match these unit selections (i.e. no unit conversion is done between the spreadsheet and the database import.



Note: You must be logged in as an Administrator to save anything to the database.

Figure 50 – Echo[®] Import Alarm Templates from Excel Dialog screen

The Alarm templates import process requires 2 steps. Clicking the **Add New Alarm Templates to Existing Echo Templates** button will transfer the templates found in the spreadsheet to the **Echo Alarm Templates** table as shown below. When this action is complete the dialog shown in Figure 51. Now you can edit the alarm templates in the table on the right before saving them by clicking the **Save Echo Alarm Templates** button. If you want to edit the list (select a column and rt-click it) then choose the Cancel option on this dialog then edit the table and then click the **Save Echo Alarm Templates** button

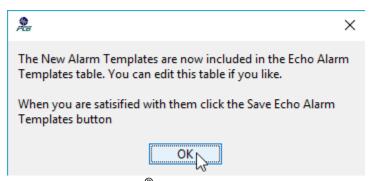


Figure 51 – Echo[®] Add Alarm Templates Dialog

Sensor Import Alarm List Import							
New Alarm Templates (from Excel in	nport file)			Echo Alarm Templates			
Template Name	Big Fan	Small Fan		Template Name	Big Fan	Small Fan	Intake Fan
Velocity (mm/s rms) Warning	0.5	0.4		Velocity (mm/s rms) Warning	0.5	0.4	1.5
Velocity (mm/s rms) Critical	0.7	0.6		Velocity (mm/s rms) Critical	0.7	0.6	1.1
Velocity (mm/s pk) Warning	0.5	0.4		Velocity (mm/s pk) Warning	0.5	0.4	1.1
Velocity (mm/s pk) Critical	0.7	0.6		Velocity (mm/s pk) Critical	0.7	0.6	1.1
Acceleration (g rms) Warning	0.5	0.4		Acceleration (grans) Warning	0.5	0.4	1.1
Acceleration (g rms) Critical	0.7	0 6		 Acceleration (g rms) Critical 	0.7	0.6	1.1
Acceleration (g pk) Warning	0.5	0.4		Acceleration (g pk) Warning	0.5	0.4	1.1
Acceleration (g pk) Critical	0.7	0.6		Acceleration (g pk) Critical	0.7	0.6	1.1
Acceleration (g true pk) Warning	0.5	0.4		Acceleration (g true pk) Warning	0.5	0.4	1.1
Acceleration (g true pk) Critical	0.7	0.6	1	Acceleration (g true pk) Critical	0.7	0.6	1.1
Crest Factor Warning	0.5	0.4		Crest Factor Warning	0.5	0.4	1.1
Crest Factor Critical	0.6	0.5		Crest Factor Critical	0.6	0.5	2.5
<				<			>
				You may edit the Alarm templates he	re before addir	ng them to the E	cho System
		Add New Alarm Templates to Echo Alarm Templates				Save Ecl Alarm Temj	
							W
ho Spreadsheet Template File Path							

Echo[®] Monitoring Software User's Manual

Figure 52 – EchoPlus® Import Alarm Templates Screen

4.2.8 Echo[®] Sensor Data Display Preferences

The screens that display Echo[®] transmission data (Live Data and Historical Data screens) can be customized to show some or all of the transmission fields. Additionally the order of the data columns can be selected. To accomplish this, select the Data Display Preferences option from the Main Screen menu bar as shown in Figure 53.

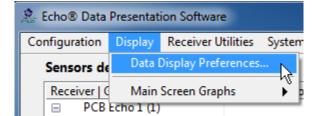


Figure 53 – Echo[®] Main Screen Menu options – Data Display Preferences

When activated the 1st tab is the Data Display tab which contains the data field selections shown in Figure 54. This screen has two columns; the column on the left shows the data items NOT being displayed on the data screens. The column on the right shows what is already being displayed. To display a new field or to remove a field, simply highlight it by clicking on the item and drag it either to the right column to display it or to the left column to stop displaying it.

The 2 screens in Figure 54 and Figure 96 Figure 55 show an example of the Average SNR data field, which was previously not displayed, being dragged to the displayed items list.

It is important to note that where the item is dragged to on the right side list determines its column position in the tables. In this case the Average SNR data will be displayed in the 3^{rd} column on the screens that display it.

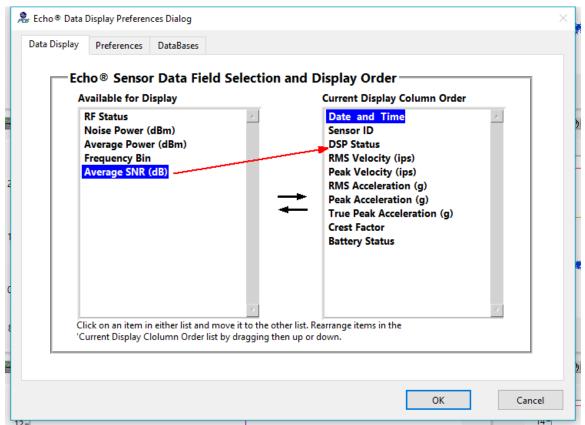


Figure 54 – Echo[®] Data Display Preferences Screen before change

It is also possible to reorder the columns of data fields already being displayed. To do so, click on a data item in the right column so it highlights and drag it up or down to the position it is to be displayed in. When all selections are made, click on the Close button to save them. Any screens currently open that display these fields will need to be closed and reopened to see the new selections.

no® Sensor vailable for Di		on and Display Order Current Display Column Order
RF Status Noise Power (Average Powe Frequency Bin	r (dBm)	Date and Time Sensor ID DSP Status Average SNR (dB) RMS Velocity (ips) Peak Velocity (ips) RMS Acceleration (g) Peak Acceleration (g) True Peak Acceleration (g) Crest Factor Battery Status
	either list and move it to the olumn Order list by dragging	e other list. Rearrange items in the g then up or down.

Figure 55 – Echo[®] Data Display Preferences Screen after change

The **Preferences** tab of the Data Display Preferences Dialog window, Figure 56, provides controls for the Tier labels and how and when certain screens refresh their data.

Tree Hierarchy Tier Labels - Use the 4 tier name controls for the naming of the 4 tiers on the sensor tree used in on the main screen and the alarm status screen.

ree Hierarchy Tier Labels	Main Screen Items	
	Main Screen Refresh Rate In Minutes 15	
Tier 1 Label Plant	Period of data to display in Main screen graph All	\sim
Tier 2 Label Area	12:08:13.034 PI	Veek Veeks Ionth
Tier 3 Label Machine	Status Screen Items	lonths Ionths
Tier 4 Label Location	Echo System Overview Monitor 1 Cus	ear tom
		conds nutes
] Use Local Decimal Point Separator for Datab	ase Queries Display Velocity Data In m	nm/s

Figure 56 – Echo[®] Data Display Preferences Screen

Main Screen Items

- Main Screen Refresh Rate determines how often, in minutes, the main screen refreshes its sensor list to show up to date status. A setting of 0 disables the status update.
- Period of data to display in main screen graph This setting determines the amount of data to display in the graph on the main screen when a sensor is selected from the list in the left panel. The options are shown in the pull down list above. To select a period not listed select 'Custom' and set the Custom Start and Stop times. Its purpose is to increase performance when large data sets are kept in the database or to compare data from different sensors without having to reselect the period manually when each sensor is selected. NOTE The data select tool

on the True Peak Acceleration graph can be used to set the Custom period temporarily.

Status Screen Items

- Echo System Overview Monitor This selects which monitor, on a multimonitor PC, the Echo[®] System Overview Screen displays on. The number 1 selects the primary display monitor.
- Echo System Overview Paging Rate If the number of sensors exceeds the ability of the software to show them in a single page on the Echo[®] System Overview Screen then the software will break up the list into pages. This is the rate, in seconds, at which the pages change.
- Status Screen DB Refresh Rate This is the rate, in minutes, which the database is queried to refresh the data of various status screens. These screens include the Echo[®] System Overview screen, the System Alarm screens and the Sensor Status screens.

The 'Use Local Decimal Point Separator' control is used for data type conversions between the Echo[®] Data Presentation Software and the SQL Server database. If checked the conversion will always use a '.' as a decimal point in a real number. This may be required for the installed SQL Server. If checked then the local convention as defined by the PC's operating system will be used (e.g. a comma ',' is used in Europe and South America). The default is to always use '.' (not checked).

Velocity and Acceleration Display Units – Separate controls for selecting the display units of velocity and acceleration data are located at the bottom right of this screen. For velocity data select ips – English or mm/s – Metric. For acceleration data select g's – English or m/s^2 – Metric. These are universal settings. If mm/s is selected for velocity then all screens that display velocity data readings will display them in mm/s units (mm/s). Likewise for acceleration data, if g's is selected for acceleration data, then all screens that display acceleration data readings will display them in g's.

Note: Data is <u>always</u> stored in the SQL database in English units and converted to Metric for display if necessary. This document displays data in English units.

4.2.8.1 Multiple Databases

If you have more than 1 database identified in the receiver configurations then the 'Databases' tab will appear. Here you will select the database you'd like to view data from for this instance of the Echo[®] Data Presentation software. If you check the 'Use this database selection' box then in other situations where a database could be selected you will not be prompted to select one and the one selected here will be used. If you are only using one database then this tab will not be shown.

Echo[®] Monitoring Software User's Manual

	Display Preferen	ices bialog	
Data Display	Preferences	DataBases	
Databa	ase Selection	for Display	
EchoD	ataSQL.udl		
EchoD	ataSQL2.udl		

Use this Database Selection (don't prompt) Figure 57 – Echo[®] Data Display Preferences 'Databases' tab

4.2.9 Echo[®] Channel Notes

Channel Notes are a way to add annotations to a channel's data or to document information about the channel itself in the form of a general note. Notes can be up to 50 characters long and those that are associated with a transmission are color coded.

Echo[®] Notes can be added to annotate a channels data by using the cursor on the True Peak Acceleration graph of a channel on the main screen to select a specific transmission and right clicking the cursor and then selecting the 'Create Note' option (Figure 58). This can also be done on the Advanced Plot Screen.

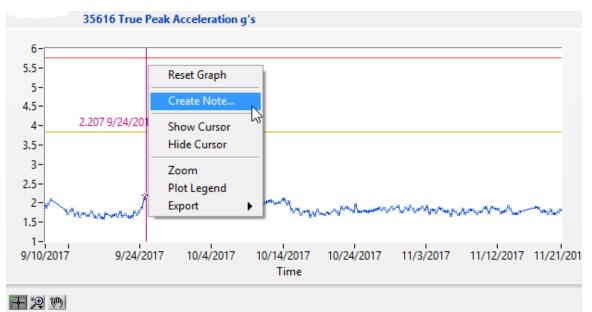


Figure 58 – Echo[®] Add Channel Note

When 'Create Note' is selected the Create Channel Note dialog screen will appear where you can type in the note. Select the color for the note by clicking on the color box and selecting a color from the resulting pallet. To disassociate a note from a specific transmission, click (check) the 'General Note' box.

Create a Channel Note for 35616 True Peak Acceler	
My Test Note	
Select the Note Color	General Note, not associated with a transmission

Figure 59 – Echo[®] Channel Note Dialog Screen

To create the note, click OK. The note will appear on all of the data graphs for the selected channel on the main screen and on the graph in the Advanced Plot screen.

Tip: Notes can be moved on the data graph by selecting the cursor tool $\blacksquare \textcircled{2}$, clicking on the note itself and dragging it.



Figure 60 – Echo $^{\otimes}$ Data graph with Channel Notes displayed

To suppress the display of channel notes on the main screen graphs select Display | Main Screen Graphs | Disable Note Display from the main menu bar of type <ctrl> N.

& Echo® Data	Presentati	ion Software						
Configuration	Display	Receiver Utilities	System	m View	Tools	Administration	Help	
25 Sensors	Data (Display Preferences		1				
Plant Area	Main	Screen Graphs	- F	Disp	lay Perio	bd		+
Dust	Dust Collection		Display All Graphs Zoom			Ctrl+A ▶		
🖃 Ba	 Bamboo Dust Collect 							
=	Bamboo	DC D201		2 Link	Graph S	cales to True Pea	k Accel	
	Moto	r OB Brg. 1H				Display		Ctrl+N
		r OB Brg. 1V						Cm+n

Figure 61 – Echo[®] Channel Note Display Suppression

To view, edit, delete or search the channel notes select, Tools | View/Edit Channel Notes, from the main screen menu bar, or, right click any channel in the channel list and select View/Edit Channel Notes to display the Echo[®] Channel Note Viewer (Figure 63).

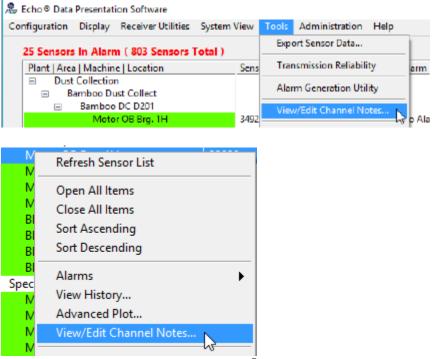


Figure 62 – Echo[®] Channel Note Viewer Access

4.2.9.1 Echo[®] Channel Note Viewer

The Channel Note Viewer (Figure 63) displays a specific channel's notes or all existing channel notes. Notes can be edited, deleted or searched using this utility. General notes, those not associated with a transmission, can be created here. General notes are identified in the table by '**'being prepended to the text in the **Note** column. Most Channel Note functions are accessed by right clicking on the table (Figure 64) and selecting a function. Multiple notes can be selected by holding down the <ctrl> key while clicking on notes

Sensor Id	Machine	Location	Note Creation Date	Note	
242	Stand Alone	Office	Fri, May 17, 2019 10:46 AM	Start LADWP	
33755	Roto Clone #1 (A)	Motor IB Brg. 2V	Fri, May 17, 2019 11:03 AM	works better here	
33769	Dry Base D102 DC (BHSE 1611)(A)	Motor OB Brg. 1V	Fri, May 10, 2019 12:23 PM	Machine ON	
33924	Bamboo Spencer VAC (D205) (A)	Blower IB Brg. 3H	Fri, May 10, 2019 2:36 PM	machine is off	
34488	Sheet LN #3 DC D105(A)	Motor OB Brg. 1H	Thu, May 2, 2019 10:46 AM	This is a long channel note for this channel	
34690	Bulksugar Spencer VAC(A)	Motor IB Brg. 2H	Mon, May 13, 2019 1:10 PM	my note	
34692	Bulksugar Spencer VAC(A)	Blower IB Brg. 3H	Tue, May 14, 2019 12:46 PM	Peak	
34693	Bulksugar Spencer VAC(A)	Blower IB Brg. 3V	Fri, May 10, 2019 4:50 PM	**General Note 1	
34694	Bulksugar Spencer VAC(A)	Blower OB Brg. 4H	Fri, May 10, 2019 2:36 PM	Peak Peak	
34961	GBO Packaging DC(BHSE-1644)(A)	Motor OB Brg. 1V	Wed, May 1, 2019 4:10 PM	a new note	
34963	GBO Packaging DC(BHSE-1644)(A)	Motor IB Brg. 2V	Tue, May 7, 2019 5:43 PM	the machine is off	
35306	Base RTU 910(A)	Motor IB Brg. 2H	Mon, May 13, 2019 2:33 PM	my new note at this position	
35616	3rd Floor AWU Supply Fan	Motor OB Brg. 1H	Mon, May 13, 2019 12:20 PM	this is another note	
35616	3rd Floor AWU Supply Fan	Motor OB Brg. 1H	Fri, May 10, 2019 7:56 AM	new note	
35616	3rd Floor AWU Supply Fan	Motor OB Brg. 1H	Tue, May 21, 2019 1:23 PM	This is a channel note	
35617	3rd Floor AWU Supply Fan	Motor OB Brg. 1V	Fri, May 3, 2019 10:40 AM	**general note not associated with a transmission	
35617	3rd Floor AWU Supply Fan	Motor OB Brg. 1V	Thu, May 9, 2019 11:23 AM	This is another 35617 note	
35617	3rd Floor AWU Supply Fan	Motor OB Brg. 1V	Thu, May 9, 2019 5:30 PM	New Acceleration Peak	
35619	3rd Floor AWU Supply Fan	Motor IB Brg. 2V	Thu, May 9, 2019 10:50 AM	35619 note 153	
35620	3rd Floor AWU Supply Fan	Blower IB Brg. 3H	Wed, May 8, 2019 3:40 PM	random spike	
35622	3rd Floor AWU Supply Fan	Blower OB Brg. 4H	Wed, May 1, 2019 3:53 PM	Channel note	

Figure 63 – Echo[®] Channel Note Viewer Screen

4.2.9.1.1 Searching Channel Notes

To search the notes type the search string in the search control in the bottom left of the screen and click the search button. Any note that contains the search string in any of the displayed fields will be highlighted. The search string is case sensitive.

4.2.9.1.2 Viewing Channel Notes

To view all notes check the View All box and click Refresh Notes. Alternatively, to view only the notes for a specific channel, clear the View All box and enter the sensor id and click the Refresh Notes button.

4.2.9.1.3 Deleting Channel Notes

Notes can be deleted by selecting a note (or notes) in the table, right clicking the mouse and selecting 'Delete Selected Notes'. A confirmation dialog will appear and, if accepted, the notes will be deleted.

Notes will also be deleted if the transmission they are associated with is deleted from the database using one of the transmission maintenance screens (Section 4.2.14.5.1).

4.2.9.1.4 Viewing Sensor Data associated with a Note

The 'View this Channel's Data' option will cause the Note Viewer window to close and the calling (Main, Advanced Plot, or Transmission maintenance) screen to refresh with the selected sensor's data.

🌡 Echo Cha	nnel Note Vie	wer		
cho Chani	nel Notes			
Sensor Id	Machine		Locati	on
242	Stand Alo	Add a General Note		
33755	Roto Clon -			IB Brg. 2V
33769	Dry Base I	Edit Selected Channel Not	te	OB Brg. 1V
33924	Bamboo S	Delete Selected Notes	N	r IB Brg. 3H
34488	Sheet LN	View this Channell's Data	- W	OB Brg. 1H
34690	Bulksugar	View this Channel's Data		IB Brg. 2H

Figure 64 – Echo® Channel Note Viewer table menu options

4.2.10 Determining Echo[®] Alarm Levels

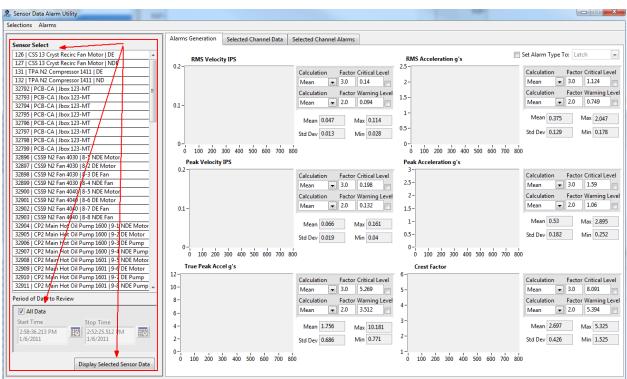
Alarm levels can be set for both warning and critical levels, of each data type, for each sensor. These levels are defined in the sensor configuration screens. Accurately determining these levels is critical for efficient monitoring of machinery health. The Echo[®] Data Presentation Software provides a powerful tool for determining the alarm levels based on data captured by the sensors. It also provides a simple method to set up alarm templates if the levels are already known.

4.2.10.1 Echo[®] Alarm Generation Utility

Select **Tools** | **Alarm Generation Utility** from the Echo[®] Data Presentation Software main screen menu bar or Right-click the Sensor tree and select the **Determine Alarm Levels** option to access the Alarm Generation Utility and display the screen shown in Figure 65. This screen has four major components; the sensor list, the Alarm Generation tab, the Selected Channel data tab and the Selected Channel Alarm tab.

4.2.10.1.1 Alarm Generation Tab

This tab contains the indicators and controls to determine alarm levels from the collected data.



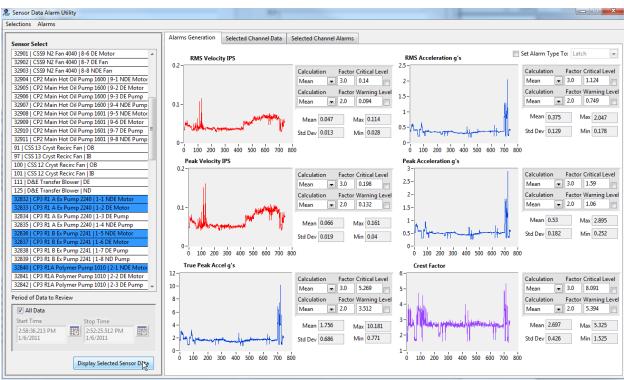
Echo® Monitoring Software User's Manual

Figure 65 – Echo[®] Alarm Generation Screen

On the left of the screen, highlighted above, is a sensor list which contains all of the sensors in the selected database (the software can be set up to use several databases – up to 1 per receiver). From this list, one or more, sensors can be selected to provide data for the alarm generation utility. This list can be customized to display only sensors of a desired type by following the process described in section 4.2.10.1.2. Clicking a single sensor causes its data to be immediately displayed in all graphs. To add sensors, use the <ctrl> or <shift> keys while clicking on sensors in the list.

Please note that if more than 10 sensors are selected, only the 1st 10 will be displayed in the Selected Channel Data and Selected Channel Alarm tabs. However, the data from all selected sensors will be averaged for display on the main Alarm Generation tab graphs.

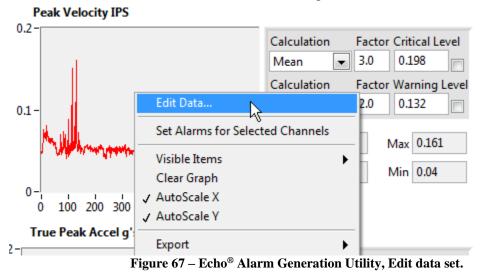
To use this utility select the desired sensors, as described above, and the period over which to analyze the data, then click the **Display Selected Sensor Data** button located below the sensor list. This causes data to be retrieved from the data base and **averaged** to create a single waveform for each data type. This data is displayed in the six graphs shown on the Alarm Generation tab, Figure 66. The mean, standard deviation, maximum and minimum values for each waveform are also calculated and displayed for each data type.



Echo® Monitoring Software User's Manual

Figure 66 – Echo[®] Alarm Generation Screen with multiple sensors selected

To further refine the data used to create an alarm the data set can be edited to remove data points that are considered abnormal. To do this right-click on the graph whose data is to be modified and select Edit Data as shown in Figure 67.



This displays the **Edit Averaged Data for Alarms** dialog box (Figure 68). In this dialog select the data to delete from the data set for this data type (in this case remove values greater than 0.1). You can also apply this action to all data types by checking the **Apply To all Data Types** box.

Echo[®] Monitoring Software User's Manual

Greater Than Apply to All Data Types	Greater Than 🔹	0 1000
Apply to All Data Types		0.1000
	Apply to All Data Types	

Figure 68 – Echo® Alarm Generation Utility, Edit Averaged Data dialog

Figure 69 shows the Peak Velocity data after this operation and the selections that can be used to calculate an alarm automatically.

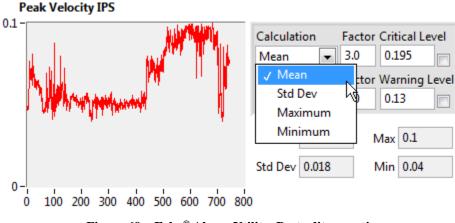


Figure 69 – Echo[®] Alarm Utility, Post edit operation

Alarms for warning and critical levels are determined in the same way; select a **Calculation** method and set a **Factor** to multiply it by. The level will be displayed in the box next to the factor setting. Alternatively the level can be set manually by simply typing it in the Warning or Critical level controls.

Figure 70 shows an alarm setting example.

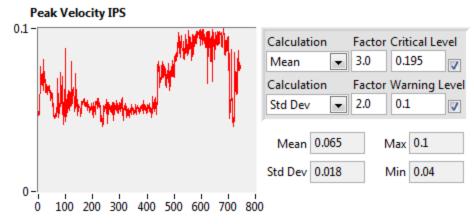


Figure 70 – Echo Alarm Utility, Alarm Set Example

The calculated Mean= 0.065; Standard Deviation=0.018; Max= 0.1; Min=0.04

- Critical Level Mean (0.65) * Factor (3.0) = 0.195 IPS
- Warning Level Std Dev (0.018) * Factor (2.0) + Mean (0.065) = 0.10

After the alarm levels are calculated the last step, prior to assigning them to the sensor by updating the sensor's configuration in the database, is to set the alarm type. In the top right of the Alarm Generation tab is a check box to set the alarm type (Figure 71). If this box is checked the alarm type for each selected sensor will be set to the indicated alarm type.

v	Set Alarm Type To: Latch
	Disable
	Calculation Fa Latch
1.1	Mean 💽 3. Non Latch 🕅
	Calculation Factor Warning Level
a l	Mean 💌 2.0 0.749

Figure 71 – Echo[®] Alarm Utility, Alarm Type Setting

Checking the Critical Level and/or Warning Level boxes for each data type determines which alarm levels are updated. They can be set manually or use the Alarm Generation Utility menu bar quick links (Figure 72).

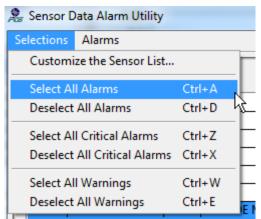


Figure 72 – Echo[®] Alarm Utility menu bar items

Finally, when all the values are set, click the **Set Selected Alarms** menu item (Figure 73) to update the sensor configuration in the database.

🧟 Sensor D	ata Alarm	Utility	
Selections	Alarms		
Sensor S		elected Alarms	Ala
		ho [®] Alarm Utility, Set Alarms Action	

4.2.10.1.2 Customizing the Sensor List

To limit the sensors presented in the sensor list to those of a particular type use the **AlarmGen Custom Sensor Query** function. Selecting **Selections** | **Customize the Sensor List** from the menu bar brings up the dialog box (Figure 74). This utility uses one of the three sensor naming fields established in the sensor configuration process to determine which sensors populate the list. Choose the Machine, Location or Group ID field and then type the key word to search for and click the **Search** button. In this example we want all sensors with the word **'Hot Oil'** in the **Machine** field. This search reveals 24 sensors in the database that match that criterion and lists them in the results table for review. When satisfied click the OK button to return to the Alarm Utility main screen when the sensor list now only contains the entries from the search (Figure 75) making it easier to select data from similar data sources for analysis and, ultimately, alarm level setting.

Select Sensors from the	Field: Machine	
That Contain the Word(s): Hot Oil	
		Search
Results	Items Found	d 24
32864 CP4 Main Hot Oil Pump 160	0 5-1 NDE Motor	
32865 CP4 Main Hot Oil Pump 160	0 5-2 DE Motor	=
32866 CP4 Main Hot Oil Pump 160	0 5-3 DE Pump	
32867 CP4 Main Hot Oil Pump 160	0 5-4 NDE Pump	
32868 CP4 Main Hot Oil Pump 160	1 5-5 NDE Motor	
32869 CP4 Main Hot Oil Pump 160	1 5-6 DE Motor	
32870 CP4 Main Hot Oil Pump 160	1 5-7 DE Pump	-

Figure 74 – Echo[®] Alarm Utility, Custom Sensor Query

Echo[®] Monitoring Software User's Manual

lensor Data Alarm Utility
Selections Alarms
Sensor Select
32864 CP4 Main Hot Oil Pump 1600 5-1 NDE Motor 🔺
32865 CP4 Main Hot Oil Pump 1600 5-2 DE Motor
32866 CP4 Main Hot Oil Pump 1600 5-3 DE Pump
32867 CP4 Main Hot Oil Pump 1600 5-4 NDE Pump
32868 CP4 Main Hot Oil Pump 1601 5-5 NDE Motor
32869 CP4 Main Hot Oil Pump 1601 5-6 DE Motor
32870 CP4 Main Hot Oil Pump 1601 5-7 DE Pump
32871 CP4 Main Hot Oil Pump 1601 5-8 NDE Pump
32872 CP3 Main Hot Oil Pump 1600 6-1 NDE Motor
32873 CP3 Main Hot Oil Pump 1600 6-2 DE Motor
32874 CP3 Main Hot Oil Pump 1600 6-3 DE Pump
32875 CP3 Main Hot Oil Pump 1600 6-4 NDE Pump
32876 CP3 Main Hot Oil Pump 1601 6-5 NDE Motor
32877 CP3 Main Hot Oil Pump 1601 6-6 DE Motor
32878 CP3 Main Hot Oil Pump 1601 6-7 DE Pump
32879 CP3 Main Hot Oil Pump 1601 6-8 NDE Pump
32904 CP2 Main Hot Oil Pump 1600 9-1 NDE Motor
32905 CP2 Main Hot Oil Pump 1600 9-2 DE Motor
32906 CP2 Main Hot Oil Pump 1600 9-3 DE Pump
32907 CP2 Main Hot Oil Pump 1600 9-4 NDE Pump
32908 CP2 Main Hot Oil Pump 1601 9-5 NDE Motor
32909 CP2 Main Hot Oil Pump 1601 9-6 DE Motor
32910 CP2 Main Hot Oil Pump 1601 9-7 DE Pump
32911 CP2 Main Hot Oil Pump 1601 9-8 NDE Pump

Figure 75 – Echo[®] Alarm Utility, modified sensor list

4.2.10.1.3 Alarm Generation - Selected Channel Data Tab

This tab, Figure 76, displays a large graph of the selected data type for the selected sensors. Up to 10 waveforms can be displayed simultaneously. Data is displayed after the sensors are selected on the left and the **Display Selected Sensor Data** button is activated. Along with the waveform data is the mean value of all readings for each waveform, displayed to the right of the graph legend, and an overall mean value of all waveforms.

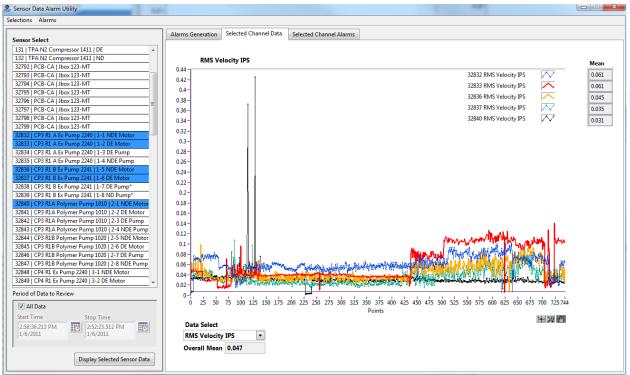


Figure 76 – Echo[®] Alarm Utility, Selected Channel Data tab

This screen is provided for informational purposes only.

4.2.10.1.4 Alarm Generation - Selected Channel Alarms Tab

This tab, Figure 77, provides a table of the current alarm settings for up to 10 selected sensors. These values will update when new alarms are generated from the Alarm Generation tab. This screen is provided primarily for informational purposes but it does provide a convenient way to create an alarm template.

Bit State CP3 R1 A Ex Pump 2240 CP3 R1 A Ex Pump 2240 CP3 R1 A Ex Pump 2240 CP3 R1 B Ex Pump 2240 CP3 R1 A Ex Pump 240 CP3 R1 A Ex Pump 240 <thcp3 a="" e<="" r1="" th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th></thcp3>							
131 TPA N2 Compressor 1411 ND 132 TPA N2 Compressor 1411 ND 2779 IPCE-CA, Jox 123-MT 2778 IPCE-CA, Jox 123-MT 2789 IPCE-CA, Jox 12-NDE Wator 2838 IPCB RA L & F. Pump 2240 I-1 NDE Motor 2838 IPCB RA L & F. Pump 2241 I-4 NDE Pump 2838 IPCB RA L & F. Pump 2241 I-4 NDE Pump 2838 IPCB RA L & Polymer Pump 1001 2-3 DE Motor 2838 IPCB RA L Polymer Pump 1001 2-3 DE Motor 2838	Generatior	n Selected C	Channel Data Selected Char	nel Alarms			
132 [TPA NZ Compressor 1411] ND 27792 [PCB-CA Jbox 123-MT 27793 [PCB-CA Jbox 123-MT 27794 [PCB-CA Jbox 123-MT 27795 [PCB-CA Jbox 123-MT 27796 [PCB-CA Jbox 123-MT 27798 [PCB-CA Jbox 123-MT 27898 [PCB-CA Jbox 123-MT 2788 [PCB-CA Jbox 123-MT<							
32792 PCB-CA Joox 123-MT 32792 PCB-CA Joox 123-MT 32795 PCB-CA Joox 123-MT 32796 PCB-CA Joox 123-MT 32796 PCB-CA Joox 123-MT 32796 PCB-CA Joox 123-MT 3283 (P3 RL A Ex Pump 2240 1-1 NDE Motor 3283 (P3 RL A Ex Pump 2240 1-1 NDE Motor 3283 (P3 RL A Ex Pump 2240 1-1 NDE Motor 3283 (P3 RL A Ex Pump 2240 1-1 NDE Motor 3283 (P3 RL B Ex Pump 2241 1-5 NDE Motor 3283 (P3 RL B Ex Pump 2241 1-4 DE Pump) 3283 (P3 RL B Ex Pump 2241 1-4 DE Motor 3283 (P3 RL B Ex Pump 2241 1-2 DE Motor 3283 (P3 RL B Ex Pump 2241 1-2 DE Motor 3284 (P3 RL B Ex Pump 2241 1-2 DE Motor 3283 (P3 RL B Polymer Pump 1010 2-1 DE Motor 3284 (P3 RL A Polymer Pump 1010 2-2 DE Motor 3284 (P3 RL A Polymer Pump 1020 2-2 DE Motor 3284 (P3 RLA Polymer Pump 1020 2-2							
22794 PCB-CA Jbox 123-MT 22794 PCB-CA Jbox 123-MT 23795 PCB-CA Jbox 123-MT 32795 PCB-CA Jbox 123-MT 32831 CP3 RL A Ex Pump 2240 32831 CP3 RL A Ex Pump 2240 32832 CP3 RL A Ex Pump 2240 32831 CP3 RL A Ex Pump 2241 32841 CP							
3237 CP3R L1 Box 123-MT 32832 32833 32836 32795 CPC-CA Jox 123-MT 1 Sensor Id 32832 32831 32836 32795 CPC-CA Jox 123-MT 1 2 DE Act Jox 123-MT 1-5 NDE Motor 1-5 NDE Motor 32795 PCC-CA Jox 123-MT 1 2 DE Motor 1-5 NDE Motor 1-5 NDE Motor 32831 CP3 R1 A Ex Pump 2240 1-3 DE Pump 2 0.05 0.23 32831 CP3 R1 A Ex Pump 2240 1-3 DE Pump 2 0.10 0.10 0.10 32831 CP3 R1 A Ex Pump 2240 1-4 NDE Pump 2 0.5 0.23 0.5 0.23 32831 CP3 R1 A Ex Pump 2240 1-4 NDE Pump 2 0.10 0.10 0.10 1.4 32831 CP3 R1 A Ex Pump 2241 1-5 NDE Motor 3.6 0.36 Export 32831 CP3 R1 A Ex Pump 2241 1-5 NDE Motor 3.77 3.77 3.77 32841 CP3 R1A Polymer Pump 1001 2-2 DE Motor 2.27 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>							
32766 IPCB-CA Ibox 123-MT 32776 IPCB-CA Jbox 123-MT 32786 IPCB-CA Jbox 123-MT 3283 IPCB-CA Jbox 123-MT 3284 IPCB-CA Jbox 123-MT 3283 IPCB-CA Jbox 123-MT 3284 IPCB-CA Jbox 123-MT 3283 IPCB-RA IB Ex Pump 2241	nt Alar	rm Setting	gs				
32797 PCB-CA box 123-MT Location 1-1 NDE Motor 1-5 NDE Motor 1-5 NDE Motor 32789 PCB-CA box 123-MT Location 1-1 NDE Motor 1-2 DE Motor 1-5 NDE Motor 32831 CP3 RL A Ex Pump 2240 [1-1 NDE Motor RMS Velocity (Vritical IPS 0.23 0.05 0.23 32831 CP3 RL A Ex Pump 2240 [1-3 DE Pump 0.10 0.10 0.10 0.10 32835 CP3 RL A Ex Pump 2240 [1-3 DE Pump 0.14 0.14 0.14 0.14 32835 CP3 RL B Ex Pump 2241 [1-5 NDE Motor 32836 CP3 RLB Ex Pump 2241 [1-5 DE Pump* 0.36 0.36 Export 32836 CP3 RLB Ex Pump 2241 [1-5 DE Motor 3284 CP3 RLB A Pump* 241 [1-5 DE Motor 1.20 NDK Accel Varning g 0.36 0.36 Export 32831 CP3 RLB Pump 241 [1-5 DE Motor 3284 CP3 RLB Pump 241 [1-5 DE Motor 3.77 3.77 3.77 Ture Peak Accel Varning g 1.70 1.07 Peak Accel Varning g 1.59 1.59 1.59 1.59 1.59 1.59 1.59 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 <td< td=""><td>r Id</td><td></td><td>32832</td><td>32833</td><td>32836</td><td>32837</td><td>32840</td></td<>	r Id		32832	32833	32836	32837	32840
32797 PCB-CA Jox 123-MT 1-1 NDE Motor 1-2 DE Motor 1-5 NDE Motor 32788 PCB-CA Jox 123-MT 32788 PCB-CA Jox 123-MT 1-1 NDE Motor 1-2 DE Motor 1-5 NDE Motor 3283 CP3 RL A Ex Pump 2240 1-2 DE Motor 3283 CP3 RL A Ex Pump 2240 1-2 DE Motor 0.05 0.23 0.05 0.23 3283 CP3 RL A Ex Pump 2240 1-2 DE Motor 3283 CP3 RL A Ex Pump 2240 1-2 NDE Motor 0.10 0.10 0.10 0.10 3283 CP3 RL B Ex Pump 2241 1-5 NDE Motor 3283 CP3 RL B Ex Pump 2241 1-5 NDE Motor 0.36 0.36 RMS Accel Varning g 0.36 0.36 RMS Accel Varning g 0.36 0.36 RMS Accel Varning g 0.37 1.07 1.07 1.07 1.07 1.07 1.07 1.07 1.98 1.59	ne		CP3 R1 A Ex Pump 2240	CP3 R1 A Ex Pump 224	0 CP3 R1 B Ex Pump 2241	CP3 R1 B Ex Pump 2241	CP3 R1A Polymer Pun
32789 PCB-CA (Jbox 123-MT) 32831 (P3 R1 A Ex Pump 2240) 1-1 NDE Motor 32832 (C9 R1 A Ex Pump 2240) 1-2 DE Motor 32835 (C9 R1 A Ex Pump 2240) 1-3 DE Pump 32835 (C9 R1 A Ex Pump 2240) 1-4 NDE Motor 32835 (C9 R1 A Ex Pump 2240) 1-4 NDE Pump 32835 (C9 R1 B Ex Pump 2241) 1-5 NDE Motor 32836 (C9 R1 B Ex Pump 2241) 1-4 DE Motor 32836 (C9 R1 B Ex Pump 2241) 1-4 DE Motor 32837 (C9 R1 B Ex Pump 2241) 1-5 NDE Motor 32838 (C9 R1 B Ex Pump 2241) 1-4 DE Motor 32841 (CP R1 A Polymer Pump 1010) 2-2 DE Motor 32841 (CP R1 A Polymer Pump 1010) 2-2 DE Motor 32841 (CP R1 A Polymer Pump 1010) 2-2 DE Motor 32841 (CP R1 A Polymer Pump 1010) 2-2 DE Motor 32841 (CP R1 A Polymer Pump 1010) 2-4 NDE Pump 32841 (CP R1 R Polymer Pump 1020) 2-5 NDE Motor 32841 (CP R1 R Polymer Pump 1020) 2-5 NDE Motor 32841 (CP R1 R Polymer Pump 1020) 2-5 NDE Motor	on					1-6 DE Motor	2-1 NDE Motor
32799 PCB-CA (J loox 123-MT 32799 PCB-CA (J loox 123-MT 3283 (CP 81 A Ex Pump 2240) 11-10 DE Motor 3283 (CP 81 A Ex Pump 2240) 11-3 DE Pump 3283 (CP 81 A Ex Pump 2240) 11-4 DE Pump 3283 (CP 81 A Ex Pump 2240) 11-4 DE Pump 3283 (CP 81 A Ex Pump 2240) 11-4 DE Pump 3283 (CP 81 A Ex Pump 2241) 11-5 DE Motor 3283 (CP 81 A Ex Pump 2241) 11-5 DE Motor 3283 (CP 81 A Ex Pump 2241) 11-5 DE Motor 3283 (CP 81 A Ex Pump 2241) 11-5 DE Motor 3284 (CP 81 A B Polymer Pump 100) 12-1 DE Pump* 3284 (CP 81 A B Polymer Pump 100) 12-2 DE Motor 3284 (CP 81 A B Polymer Pump 100) 12-2 DE Motor 3284 (CP 81 A B Polymer Pump 100) 12-2 DE Motor 3284 (CP 81 A B Polymer Pump 100) 12-2 DE Motor 3284 (CP 81 A B Polymer Pump 100) 12-4 NDE Pump 3284 (CP 81 A B Polymer Pump 100) 12-2 DE Motor 3284 (CP 81 A B Polymer Pump 100) 12-2 DE Motor 3284 (CP 81 A B Polymer Pump 100) 12-4 NDE Pump 3284 (CP 81 A B Polymer Pump 100) 12-2 DE Motor 3284 (CP 81 A B Polymer Pump 100) 12-2 DE Motor <td></td> <td></td> <td></td> <td></td> <td></td> <td>Latch</td> <td>Latch</td>						Latch	Latch
2888 CP8 RL A Ex Pump 2200 [1-1 NDE Motor 2888 CP8 RL A Ex Pump 2200 [1-2 DE Motor 2888 CP8 RL A Ex Pump 2200 [1-2 DE Motor 2888 CP8 RL A Ex Pump 2200 [1-4 NDE Pump 2888 CP8 RL B Ex Pump 2211 [1-5 NDE Motor 2888 CP8 RL B Ex Pump 2211 [1-5 NDE Motor 2888 CP8 RL B Ex Pump 2211 [1-5 NDE Motor 2888 CP8 RL B Ex Pump 2211 [1-8 ND E motor 2888 CP8 RL B Pump 2211 [1-8 ND E motor 2888 CP8 RL B Pump 2211 [1-8 ND E motor 2888 CP8 RL B Pump 2211 [1-8 ND E motor 2888 CP8 RL B Pump 2211 [1-8 ND E Motor 2884 CP8 RL B Pump 2210 [1-2 NDE Motor 2884 CP8 RLA Polymer Pump 1000 [2-2 NDE Motor 2884 CP8 RLA Polymer Pump 1000 [2-2 NDE Fump 2884 CP8 RLA Polymer Pump 1000 [2-2 NDE Motor 2884 CP8 RLB Polymer Pump 1000 [2-2 NDE Motor 2884 CP8 RLB Polymer Pump 1000 [2-2 NDE Motor 2884 CP8 RLB Polymer Pump 1000 [2-2 NDE Motor 2884 CP8 RLB Polymer Pump 1000 [2-2 NDE Motor 2884 CP8 RLB Polymer Pump 1000 [2-2 NDE Motor 2884 CP8 RLB Polymer Pump 1000 [2-2 NDE Motor		Naming IPS				0.05	0.23
3233 (CP3 RL & E Pump 220 [1-2 UE Motor) 3233 (CP3 RL & E Pump 220 [1-3 DE Pump 3233 (CP3 RL & E Pump 220 [1-4 NDE Pump) 3233 (CP3 RL & E Pump 220 [1-4 NDE Pump) 3233 (CP3 RL & E Pump 220 [1-4 NDE Pump) 3233 (CP3 RL & E Pump 220 [1-4 NDE Pump) 3233 (CP3 RL & E Pump 220 [1-5 NDE Motor) 3233 (CP3 RL & E Pump 220 [1-7 DE Pump)* 3233 (CP3 RL & E Pump 220 [1-7 DE Pump)* 3234 (CP3 RL & E Pump 220 [1-7 DE Pump)* 3234 (CP3 RL A Polymer Pump 100 [2-1 DE Motor) 3234 (CP3 RL A Polymer Pump 100 [2-2 DE Motor) 3234 (CP3 RL A Polymer Pump 100 [2-2 DE Motor) 3234 (CP3 RL A Polymer Pump 100 [2-2 DE Motor) 3234 (CP3 RL A Polymer Pump 100 [2-2 DE Motor) 3234 (CP3 RL A Polymer Pump 100 [2-2 DE Motor) 3234 (CP3 RL B Polymer Pump 100 [2-2 DE Motor) 3234 (CP3 RL B Polymer Pump 100 [2-2 DE Motor) 3234 (CP3 RL B Polymer Pump 100 [2-2 DE Motor) 3234 (CP3 RL B Polymer Pump 100 [2-2 DE Motor) 3234 (CP3 RL B Polymer Pump 100 [2-2 DE Motor) 3234 (CP3 RL B Polymer Pump 100 [2-2 DE Motor) 3234 (CP3 RL B Polymer Pump 100 [2-2 DE Motor) 3234 (CP3 RL B Polymer Pump 100 [2-2 DE Motor) 3234 (CP3 RL B Polymer Pump 100 [2-2 DE Motor) 3234 (CP3 RL B Polymer Pump 100 [2-2 DE Motor)		-				0.10	0.10
22233 C125 KL F Ex Pump 2201 11-50 EV during 22335 C128 KL Ex Pump 2201 11-4 NDE Pump 22335 C128 KL Ex Pump 2201 11-50 EV duror 22335 C128 KL Ex Pump 2201 11-50 EV duror 22335 C128 KL Ex Pump 2201 11-50 EV duror 22335 C128 KL Ex Pump 2201 11-50 EV duror 22335 C128 KL Ex Pump 2201 11-50 EV duror 22336 C128 KL Ex Polymer 241 11-60 EV duror 22336 C128 KL Polymer Pump 1001 2-20 EV dutor 22341 C128 KLA Polymer Pump 1001 2-20 EV dutor 22441 C128 KLA Polymer Pump 1001 2-20 EV dutor 22441 C128 KLA Polymer Pump 1001 2-4 NDE Pump 22441 C128 KLA Polymer Pump 1001 2-4 NDE Pump 22441 C128 KLA Polymer Pump 1001 2-4 NDE Pump 22441 C128 KLA Polymer Pump 1001 2-4 NDE Pump 22441 C128 KLA Polymer Pump 1001 2-4 NDE Pump 22441 C128 KLA Polymer Pump 1002 12-50 EV dutor 22441 C128 KLA Polymer Pump 1002 12-45 NDE Motor 22441 C128 KLA Polymer Pump 1002 12-45 NDE Motor 22441 C128 KLB Polymer Pump 1002 12-50 EV dutor 22441 C128 KLB Polymer Pump 1002 12-25 DE Motor 2441 C128 KLB Polym						0.14	0.30
2288 CP3 RL B Ex Pump 2241 [1-5 NDE Motor 2287 CP3 RL B Ex Pump 2241 [1-5 NDE Motor 2287 CP3 RL B Ex Pump 2241 [1-5 DE Pump* 2288 CP3 RL B Ex Pump 2241 [1-5 DE Pump* 2288 CP3 RL B Ex Pump 2241 [1-5 DE Pump* 2289 CP3 RL B Ex Pump 2241 [1-5 DE Pump* 2289 CP3 RL B Ex Pump 2241 [1-5 DE Pump* 2289 CP3 RL B Polymer Pump 1010 [2-1 NDE Motor 2284 CP3 RLA Polymer Pump 1010 [2-2 NDE Motor 2284 CP3 RLA Polymer Pump 1010 [2-2 NDE Motor 2284 CP3 RLA Polymer Pump 1010 [2-2 NDE Motor 2284 CP3 RLB Polymer Pump 1020 [2-5 DE Pump 2284 CP3 RLB Polymer Pump 1020 [2-5 DE Motor 2284 CP3 RLB Polymer Pump 1020 [2-5 DE Motor 2284 CP3 RLB Polymer Pump 1020 [2-5 DE Motor 2284 CP3 RLB Polymer Pump 1020 [2-5 DE Motor 2284 CP3 RLB Polymer Pump 1020 [2-5 DE Motor 2284 CP3 RLB Polymer Pump 1020 [2-5 DE Motor 2284 CP3 RLB Polymer Pump 1020 [2-5 DE Motor 2284 CP4 RL Ex Pump 2240 [3-1 NDE Motor 2384 CP4 RL Ex Pump 2240 [3-2 DE Motor 2844 CP4 RL Ex Pump 2240 [3-2 DE Motor <		-					0.20
22837 CP3 RL B Ex Pump 2241 1-6 DE Motor 22838 CP3 RL B Ex Pump 2241 1-12 DE Pump* 22838 CP3 RL B Ex Pump 2241 1-12 DE Pump* 32840 CP3 RL B Ex Pump 241 1-10 RD Pump* 32841 CP3 RL A Polymer Pump 1010 2-1 NDE Motor 32842 CP3 RLA Polymer Pump 1010 2-2 DE Motor 32842 CP3 RLA Polymer Pump 1010 2-3 DE Motor 32842 CP3 RLA Polymer Pump 1010 2-3 DE Motor 32842 CP3 RLA Polymer Pump 1010 2-3 DE Motor 32842 CP3 RLB Polymer Pump 1020 2-5 NDE Motor 32845 CP3 RLB Polymer Pump 1020 2-5 NDE Motor 32845 CP3 RLB Polymer Pump 1020 2-5 DE Motor 32845 CP3 RLB Polymer Pump 1020 2-7 DE Pump 32845 CP3 RLB Polymer Pump 1020 2-7 DE Pump 32847 CP3 RLB Polymer Pump 1020 2-7 DE Pump 32847 CP3 RLB Polymer Pump 1020 2-7 DE Pump 32847 CP3 RLB Polymer Pump 1020 2-7 DE Pump 32847 CP3 RLB Polymer Pump 1020 2-7 DE Pump 32849 CP4 RL Ex Pump 240 3-2 DE Motor </td <td></td> <td></td> <td></td> <td>A</td> <td>dd Selected Column to Templat</td> <td>es</td> <td></td>				A	dd Selected Column to Templat	es	
2282/2 (CPS NL BE X Pump 2241 [1-3 DE Pump)* 2283 (CPS NL BE X Pump 2241 [1-3 DE Pump)* 2283 (CPS NL BE X Pump 2241 [1-3 DE Pump)* 2284 (CPS NL BE X Pump 2241 [1-3 DE Pump) 2284 (CPS NL BE X Pump 2241 [1-3 DE Pump) 2284 (CPS NL BE X Pump 2241 [1-3 DE Pump) 2284 (CPS NL B Polymer Pump 1001 [2-3 DE Pump) 2284 (CPS NL B Polymer Pump 1001 [2-4 DE Motor) 2284 (CPS NL B Polymer Pump 1001 [2-4 DE Pump) 2284 (CPS NL B Polymer Pump 1001 [2-4 DE Pump) 2284 (CPS NL B Polymer Pump 1001 [2-4 DE Pump) 2284 (CPS NL B Polymer Pump 1002 [2-5 DE Pump) 2284 (CPS NL B Polymer Pump 1002 [2-5 DE Pump) 2284 (CPS NL B Polymer Pump 1002 [2-5 DE Pump) 2284 (CPS NL B Pumpre Pump 1002 [2-5 DE Pump) 2284 (CPS NL B Pumpre Pump 1002 [2-5 DE Pump) 2284 (CPS NL B Pumpre Pump 1002 [2-5 DE Pump) 2284 (CPS NL B Pumpre Pump 1002 [2-7 DE Pump) 2284 (CPS NL B Pumpre Pump 1002 [2-7 DE Pump) 2284 (CPS NL B Pump Pump 2240 [3-2 DE Motor) - * ************************************				Ev	port	•	3.00
32839 CP3 RL B Ex Pump 2241 1-8 ND Pump* 32839 CP3 RL A Polymer Pump 1010 2-2 INDE Motor 32841 CP3 RL A Polymer Pump 1010 2-3 DE Pump 32842 CP3 RL A Polymer Pump 1010 2-3 DE Pump 32843 CP3 RL A Polymer Pump 1010 2-3 DE Pump 32844 CP3 RL B Polymer Pump 1010 2-3 DE Pump 32841 CP3 RL B Polymer Pump 1010 2-4 NDE Pump 32841 CP3 RL B Polymer Pump 1010 2-5 DE Motor 32841 CP3 RLB Polymer Pump 1020 2-5 DE Motor 32842 CP3 RLB Polymer Pump 1020 2-5 DE Motor 32845 CP3 RLB Polymer Pump 1020 2-5 DE Pump 32846 CP4 RL Ex Pump 2240 3-1 NDE Motor 32848 CP4 RL Ex Pump 2240 3-1 NDE Motor 32849 CP4 RL Ex Pump 2240 3-2 DE Motor 32849 CP4 RL Ex Pump 2240 3-2 DE Motor 32849 CP4 RL Ex Pump 2240 3-2 DE Motor 32849 CP4 RL Ex Pump 2240 3-2 DE Motor				1.12			1.12
32801 (CP3 B1A Polymer Pump 1010) [2:1 NDE Meter 32841 (CP3 B1A Polymer Pump 1010) [2:2 DE Meter 32842] (CP3 B1A Polymer Pump 1010) [2:2 DE Meter 32843 (CP3 B1A Polymer Pump 1010) [2:4 NDE Pump 32844] (CP3 B1B Polymer Pump 1020) [2:5 NDE Meter 32845] (CP3 B1B Polymer Pump 1020) [2:5 NDE Meter 32846] (CP4 B1E Polymer Pump 1020) [2:5 DE Meter 32846]						1.07	4.30
32841 (CP3 RLA Polymer Pump 1010) 2-2 20 E Motor 32842 (CP3 RLA Polymer Pump 1010) 2-3 20 E Pump 32843 (CP3 RLA Polymer Pump 1010) 2-4 NDE Pump 32841 (CP3 RLB Polymer Pump 1020) 2-5 NDE Motor 32845 (CP3 RLB Polymer Pump 1020) 2-5 NDE Motor 32845 (CP3 RLB Polymer Pump 1020) 2-5 NDE Pump 32845 (CP3 RLB Polymer Pump 1020) 2-5 DE Pump 32846 (CP3 RLB Polymer Pump 1020) 2-5 DE Pump 32847 (CP3 RLB Polymer Pump 1020) 2-5 DE Pump 32847 (CP3 RLB Polymer Pump 1020) 2-5 DE Pump 32847 (CP3 RLB Polymer Pump 1020) 2-5 DE Pump 32847 (CP3 RLB Polymer Pump 1020) 2-5 DE Pump 32847 (CP3 RLB Polymer Pump 1020) 2-5 DE Pump 32847 (CP3 RLB Polymer Pump 1020) 2-5 DE Motor ~ - - * - - * - - * - - * - - * - - * - -		-				1.59	1.59
32842 CP3 RLA Polymer Pump 1010 12.3 DE Pump 32842 CP3 RLA Polymer Pump 1010 12.4 NDE Pump 32841 CP3 RLB Polymer Pump 1020 12.4 NDE Pump 32845 CP3 RLB Polymer Pump 1020 12.6 DE Motor 32846 CP3 RLB Polymer Pump 1020 12.6 DE Motor 32846 CP3 RLB Polymer Pump 1020 12.6 DE Motor 32846 CP3 RLB Polymer Pump 1020 12.6 DE Motor 32846 CP4 RL Ex Pump 2240 3-1 NDE Motor 32848 CP4 RL Ex Pump 2240 3-2 DE Motor * ************************************			3.77			3.77	2.05
32843 (CP3 RL8 Polymer Pump 1010) (2.4 NDE Pump 32844 (CP3 RL8 Polymer Pump 1020) (2.5 NDE Motor) 32845 (CP3 RL8 Polymer Pump 1020) (2.5 NDE Motor) 32845 (CP3 RL8 Polymer Pump 1020) (2.5 NDE Motor) 32846 (CP3 RL8 Polymer Pump 1020) (2.5 NDE Motor) 32846 (CP3 RL8 Polymer Pump 1020) (2.5 NDE Motor) 32846 (CP3 RL8 Polymer Pump 1020) (2.5 NDE Motor) 32847 (CP3 RL8 Polymer Pump 1020) (2.5 NDE Motor) 32849 (CP4 RL Ex Pump 2240) (3.2 DE Motor) * * ************************************	Peak Acce	el Critical g	5.27	5.27	5.27	5.27	5.27
32844 CP3 R1B Polymer Pump 1020 2-5 NDE Motor 32845 CP3 R1B Polymer Pump 1020 2-5 DE Motor 32845 CP3 R1B Polymer Pump 1020 2-5 DE Motor 32846 CP3 R1B Polymer Pump 1020 2-5 DE Motor 32846 CP3 R1B Polymer Pump 1020 2-5 DE Motor 32846 CP3 R1B Polymer Pump 1020 2-5 DE Motor 32847 CP3 R1B Polymer Pump 1020 2-5 NDE Motor 32848 CP4 R1 Ex Pump 2240 3-1 DE Motor 32849 CP4 R1 Ex Pump 2240 3-2 DE Motor 32849 CP4 R1 Ex Pump 2240 3-2 DE Motor 32847 CP3 R1B Polymer Pump 1020 2-5 DE Motor 32849 CP4 R1 Ex Pump 2240 3-2 DE Motor 32849 CP4 R1 Ex Pump 2240 3-2 DE Motor 32849 CP4 R1 Ex Pump 2240 3-2 DE Motor V All Data Start Time Start Time Stop Time 2-52:25:512 PM 258:36:213 PM 2-52:25:512 PM EX	Factor W	arning	5.06	9.08	5.06	5.06	8.37
32845 CP3 RLB Polymer Pump 1020 12-6 DE Motor 32845 CP3 RLB Polymer Pump 1020 12-7 DE Pump 32847 LCP3 RLB Polymer Pump 1020 12-8 DE Pump 32848 CP4 RL Ex Pump 2240 3-1 NDE Motor 32849 CP4 RL Ex Pump 2240 3-2 DE Motor Period O Data to Review	Factor Cr	itical	8.09	8.09	8.09	8.09	8.09
32845 (C P3 R1B Polymer Pump 1020 [2-7 DE Pump 32847] 32845 (C P3 R1E Polymer Pump 1020 [2-8 NDE Pump 32849] 32848 (C P4 R1 Ex Pump 2240 [3-2 DE Motor 32849] 32849 (C P4 R1 Ex Pump 2240 [3-2 DE Motor 32849] Period of Data to Review Time 500 [100 [100 [100 [100 [100 [100 [100							
32848 CP4 RL & Pump 2240 3-1 NDE Motor 32849 CP4 RL & Pump 2240 3-2 DE Motor Period of Data to Review ♥ All Data Start Time Stop Time 258:36.213 PM ₩ 0 252:25.512 PM ₩0							
32849 CP4 R1 Ex Pump 2240 3-2 DE Motor ~ Period of Data to Review							
eriod of Data to Review							
Yall Data Start Time Stop Time 2:58:36.213 PM #20 [2:58:36.213 PM #20							
Yall Data Start Time Stop Time 2:58:36.213 PM #20 [2:58:36.213 PM #20							
Start Time Stop Time 2:58:36.213 PM #20 2:58:36.213 PM #20							
2:58:36.213 PM 🔣 2:52:25.512 PM							
1/6/2011 1/6/2011							
Display Selected Sensor Data							

Figure 77 – Echo® Alarm Utility, Selected Channel Alarm Tab

To create an alarm template that can be used when configuring sensors, click in the desired column and then right-click to display the short-cut menu and select the **Add Selected Column to Templates...** item. This will display the dialog shown in Figure 78.

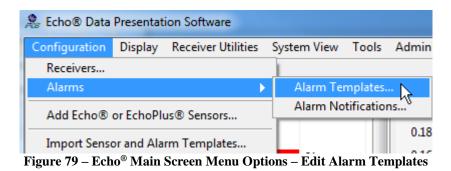
If 10 templates already exist the dialog will ask you to select which one to replace, as shown, and to name the new template. Click **OK** to save the new template and exit the dialog screen or **Cancel** to exit without saving the template.

Add Alarm T	emplate Dialog.vi	×
	eximum number of templates is 10. template would you like to replace?	
	Select a Template to Replace	
	Fan 💌	
	New Template Name	
	New Fan	
	OK Cancel	

Figure 78 – Echo[®] Alarm Utility, Create a New Template

4.2.10.2 Echo[®] Alarm Templates

When sensors are added to the system it is suggested that alarm levels be established so it can be easily ascertained that a machine is beginning to have problems. An easy way to set alarm levels that removes the tediousness from the process is to set up templates for machine types and then simply assign the template values to a sensor with one mouse click. To set up a template, click on the main screen menu bar, shown below, and select the **Edit Alarm Templates** option.



When selected the screen shown in Figure 80 will appear. The top row contains the name for a template and the values below it are the alarm levels that will be assigned to the sensor for each data type. The columns can be deleted or copied by clicking at the top of a column and dragging across it to select the entire column (Figure 81). This will be evident by the entire column being outlined in blue. Next right click the mouse and select the operation to perform.

Echo[®] Monitoring Software User's Manual

Template Name	Blower	Heater	Packing Machine	Blower 2	Cooler
Velocity (ips rms) Warning	0.5	0.4	0.4	0.5	0.5
Velocity (ips rms) Critical	0.7	0.8	0.8	0.7	0.7
Velocity (ips pk) Warning	.702	1.4	1.4	.702	.702
Velocity (ips pk) Critical	1.404	2.8	2.8	1.404	1.404
Acceleration (g rms) Warning	0.4	0.45	0.45	0.4	0.4
Acceleration (g rms) Critical	0.8	0.9	0.9	0.8	0.8
Acceleration (g pk) Warning	0.5	0.4	0.4	0.5	0.5
Acceleration (g pk) Critical	0.9	0.8	0.8	0.9	0.9
Acceleration (g true pk) Warning	0.45	0.5	0.5	0.45	0.45
Acceleration (g true pk) Critical	0.9	1.0	1.0	0.9	0.9
Crest Factor Warning	0.42	0.5	0.5	0.42	0.42
Crest Factor Critical	0.84	1.0	1.0	0.84	0.84
Type (0-Disable; 1-Latch; 2-Non Latch)	1	1	1	1	1
Missed Transmission Count	3	3	3	3	3
	1	1		(

Figure 80 – Echo® Edit Alarm Templates Screen

Template Name	Blower	Heater	Packing Machine	Blower 2	Copy Data
Velocity (ips rms) Warning	0.5	0.4	0.4	0.5	Paste Data
Velocity (ips rms) Critical	0.7	0.8	0.8	0.7	5 . T.U
Velocity (ips pk) Warning	.702	1.4	1.4	.702	Empty Table
Velocity (ips pk) Critical	1.404	2.8	2.8	1.404	Insert Column Before
Acceleration (g rms) Warning	0.4	0.45	0.45	0.4	Delete Column
Acceleration (g rms) Critical	0.8	0.9	0.9	0.8	४.६
Acceleration (g pk) Warning	0.5	0.4	0.4	0.5	0.5
Acceleration (g pk) Critical	0.9	0.8	0.8	0.9	0.9
Acceleration (g true pk) Warning	0.45	0.5	0.5	0.45	0.45
Acceleration (g true pk) Critical	0.9	1.0	1.0	0.9	0.9
Crest Factor Warning	0.42	0.5	0.5	0.42	0.42
Crest Factor Critical	0.84	1.0	1.0	0.84	0.84
Type (0-Disable; 1-Latch; 2-Non Latch)	1	1	1	1	1
Missed Transmission Count	3	3	3	3	3
•		_		_	•

Figure 81 – Editing Alarm Templates Example

When editing is complete click the Save & Close button. To assign these alarm values select the Configuration | Add Echo[®] or EchoPlus[®] Sensors menu bar option and follow the screen instruction for editing a sensors database entry.

4.2.10.3 Echo[®] Alarm Email Notifications

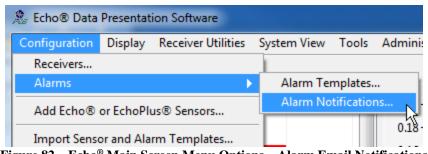


Figure 82 – Echo® Main Screen Menu Options – Alarm Email Notifications

Selecting Alarm Notifications from the main menu bar will bring up the screen shown below in Figure 83.

List Name Disable this list	List Name Disable this list	List Name Disable this list	List Name Disable this li
Management	Technicians		
SMTP Mail Server Port	SMTP Mail Server Port	SMTP Mail Server Port	SMTP Mail Server Port
smtp.company.com 25	smtp.company.com 25	25	25
Use Secure Connection (TLS\SSL)	Use Secure Connection (TLS\SSL)	Use Secure Connection (TLS\SSL)	Use Secure Connection (TLS\SSL)
Require Login	Require Login	Require Login	Require Login
Username	Username	Username	Username
Password	Password	Password	Password
Sender Email Address	Sender Email Address	Sender Email Address	Sender Email Address
echo@company.com	echo@company.com	1	1
Email Recipients	Email Recipients	Email Recipients	Email Recipients
Manager_1@company.com	Technician_1@company.com	<u>^</u>	
Manager_2@company.com	Technician_2@company.com		
Manager_3@company.com	Technician_3@company.com	×	
······································	······	· · · ·	· · · · · · · · · · · · · · · · · · ·
	·)	·)

Figure 83 – Echo® Alarm Email Notification configuration screen

This screen provides for the configuration of up to 6 email lists. Each list can have multiple recipients. Each recipient will receive an email notification whenever a sensor with the specified list produces a reading greater than or equal to the set alarm level. Each sensor's warning and critical alarms can be configured with separate notification lists. To establish a list simply fill in the fields shown above.

- List Name This can be any name you chose. These names will be listed in the Sensor configuration window when you Right-Click next to the Warming or Critical Email list fields.
- **SMTP Mail Server** Enter the name or IP address of your companies outgoing SMTP email server.
- Port Enter the SMTP server port number. Typically it is 25 or 587
- Use Secure Connection This specifies whether to use Transport Layer Security (TLS) for added security when communicating with the SMTP server.

& Alarm Notification Dialog

- **Require Login, Username, Password** If your server requires authentication then use these fields to specify the log-in username and password for the SMTP server you specify. **NOTE**: The Password is saved using the Blowfish encryption algorithm.
- **Email Recipients** enter the email address of people who should receive the notifications. The first three of each list are initially shown in the window, use the scroll bar on the right of each list to scroll down to add or see more recipients.
- **Disable this List** This is a quick way to disable an email notification list in the event you know there is a problem and you do not wish to get the notifications. This is easier than going into the sensor configuration window and removing notifications altogether.

4.2.10.3.1 Email Notification Test

Email Test provides a way to check the alarm notification email settings.

Clicking the Email Test button displays the Email Test List Selection Dialog screen that is used to specify which email list is to be used for the test.

lanagement echnicians	
echinicians	

Figure 84 – Echo[®] Alarm Email Notification Test List Selection

Select a list and click OK to continue or Cancel to cancel the process and close the window.

Selecting OK displays the Email Test Utility screen shown in Figure 85. All of the parameters from the selected list are transferred to the appropriate field in the utility. All fields can be edited as necessary. Multiple recipients are separated with a comma ','in the utility.

Click the **Send Email** button to send the test message.

area a second to the second se

Outgoing Mail Server (SMTP)	Port	echo@company.com		
smtp.company.com	25	Recipients		
Use Secure Connection (TLS	1501	Technician_1@company.com,		
	(33L)	Subject		
Require Login		Echo Test Email		
Username		Message		
Password		This is a test message from the PCB Echo Software		

Figure 85 – Echo® Alarm Email Notification Test Screen

After a successful email transmission the success dialog box, shown below, will appear.

PCB -	×
Your Email has been sent	
OK	

If an error occurs then an error message will appear.

×

4.2.11 Sensor Transmission Reliability Utility

The Sensor Transmission Reliability Utility, Tools | Transmission Reliability on the main screen menu bar, is used to determine if junction box and sensor transmissions are being received reliably or if the receiver and/or antenna needs to be moved to a more optimal location. It could also be used to determine if another receiver and antenna might be beneficial to the system. For instance, take the situation where several junction boxes and sensors are installed with one receiver and data is being received reliably without any issues. Now it is necessary to add more junction boxes and/or sensors to another location in the building. This necessitates moving the receiver and antenna. The question is how much of an impact does this have on the original sensors transmission reliability? This utility would answer that question. By running it for the period before the move and then the period after the move you can see what difference it made.

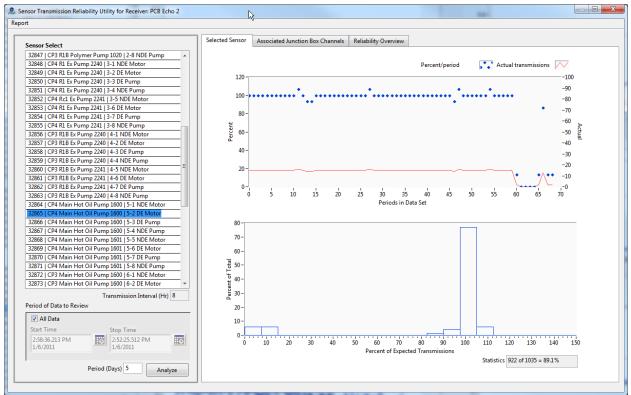


Figure 86 – Echo[®] Sensor Transmission Reliability Utility – Selected Sensor Tab

The major components of the screen are:

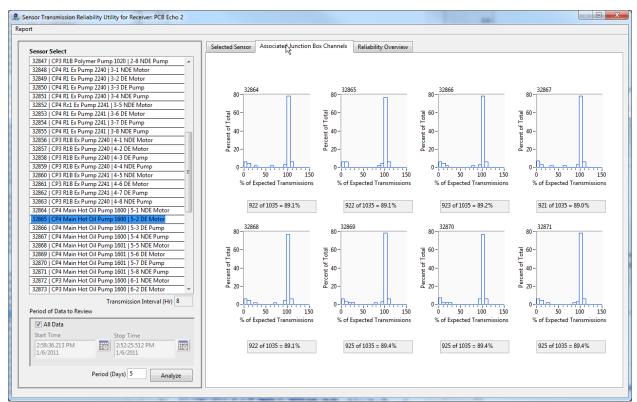
- **The Sensor Selection List** located on the left, this table lists the sensors assigned to the receiver. Selecting a sensor, by clicking the mouse on an entry, causes data for the period defined to be analyzed.
- **Time Period of Data to Review** located at the bottom left of the screen you can check the **All Data** box to use all data collected for the selected sensor or, if this box is unchecked, you can define a specific period of time to analyze the data using the Start and Stop Time controls.
- **Period** (days) This is the period over which transmissions will be grouped to form a single data point for analysis. For instance, if a sensor is scheduled to

transmit every 8 hours (3 times a day), and the period is set to 5 days then 15 transmissions should be found in the database for every 5 day interval in the Time Period being analyzed to get a rating of 100% of expected transmissions for the period. If only 5 transmissions were found then the percent of expected transmissions for the period would be 33%. These calculations are used to plot the actual performance in the graphs on the tab section of the screen.

- Selected Sensor Tab(Figure 86) This tab contains two graphs and an overall statistic of how many transmissions were expected and how many were received.
 - The graph on the top shows % of transmissions received for each period (defined by Period (days)) on the left y-axis (blue diamonds) and actual transmissions on the right y-axis over time. In the example used above a bule diamond point of 100% equates to a red data point of 15 transmissions.
 - The graph on the bottom is a histogram of how often, in groups of 10%, that percent of transmissions was achieved. In the bottom graph shown in Figure 86 we see that 100% of the selected sensors transmissions were received almost 80% of the time for the period reviewed. This is excellent since occasionally more than 100% were received, which can happen if the power is cycled on the sensor to produce 'extra' transmissions. And we see the over some periods 0% were received indicating power was likely removed for maintenance or some other reason.
- Associated Junction Box Channels Tab (Figure 88) This tab is only displayed if the sensor being analyzed is a juncrion box channel. This tab contains histograms and the overall transmission statistic for all channels on the selected sensor junction box. This is the same data that is shown for the selected sensor on the bottom graph of the Selected Sensor tab
- Reliability Overvies tab (Figure 89) This tab shows the overall reliability of every device assigned to the selected receiver. Each entry is an icon of either a junction box or a standalone sensor. Below each icon is a transmission reliability statistic for the time period analyzed. The number associated with each statistic is the sensor ID for that sensor. For junction boxes the 1st channel of the box is used. The color of the icon represents the reception quality at a glance in 20% steps. Bright green= >80%; Light Green=60-80%; Light Yellow=40-60%; Dark Yellow=20-40%; Red=<20%



Figure 87 – Echo® Sensor Transmission Reliability Utility – Reliability tab icons



Echo® Monitoring Software User's Manual

Figure 88 – Echo® Sensor Transmission Reliability Utility – Associated Junction Box Channels Tab

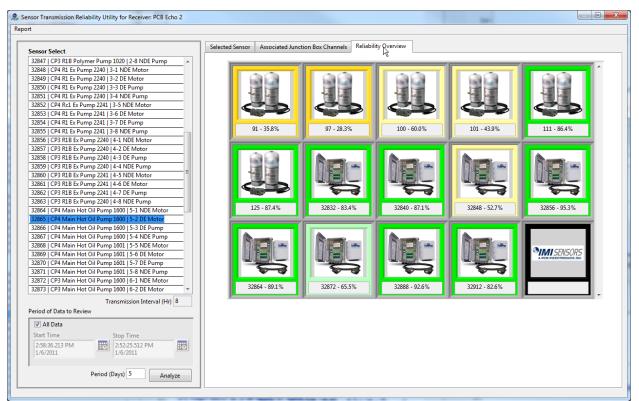


Figure 89 – Echo[®] Sensor Transmission Reliability Utility – Reliability Overview Tab

4.2.12 Export Sensor Data

This utility is used to quickly export several sensors data to a text based spreadsheet file format. It is accessed using Tools | Export Sensor Data on the main screen menu bar. On an individual sensor basis this same function is available on a sensor's History display. In this utility all of the sensors assigned to a receiver are shown in the sensor list on the left.

- Sensor List One to all sensors can be selected using the Select All button or <shift> & <ctrl> in combination with clicking the mouse.
- **Period of Data to Export** Select **All Data** by checking the check box or a specific period using the **Start and Stop Time** controls.
- Show Gap Indications If a transmission is missed then an asterisk is appended to the time and date of the next received transmission. This can be seen on the history screen. This asterisk causes problems with Excel's Time and date functions so it is excluded in these files unless specifically asked for by checking this box.
- **Prompt for File Names** If checked the operator can specify the name of each file. If left unchecked the utility will automatically name the files using the following convention: <sensor id> <mm-dd-yyyy> <hh-mm-ss>.dat (ex. 126 04-01-2015 15-56-59.dat). The files will be placed in the directory specified in the **Directory where data files will be stored** control.

	tiple sensors
126 CSS 13 Cryst Recirc Fan Motor DE	Period of Data to Export
127 CSS 13 Cryst Recirc Fan Motor NDE	Start Time
131 TPA N2 Compressor 1411 DE	
132 TPA N2 Compressor 1411 ND	2:58:36.213 PM
32792 PCB-CA Jbox 123-MT	
32793 PCB-CA Jbox 123-MT	Stop Time
32794 PCB-CA Jbox 123-MT	2:52:25.512 PM
32795 PCB-CA Jbox 123-MT	= 1/6/2011
32796 PCB-CA Jbox 123-MT	
32797 PCB-CA Jbox 123-MT	All Data
32798 PCB-CA Jbox 123-MT	
32799 PCB-CA Jbox 123-MT	
32896 CSS9 N2 Fan 4030 8-1 NDE Motor	
32897 CSS9 N2 Fan 4030 8-2 DE Motor	
32898 CSS9 N2 Fan 4030 8-3 DE Fan	
32899 CSS9 N2 Fan 4030 8-4 NDE Fan	
32900 CSS9 N2 Fan 4040 8-5 NDE Motor	
32901 CSS9 N2 Fan 4040 8-6 DE Motor	Show Gap Indications
32902 CSS9 N2 Fan 4040 8-7 DE Fan	Prompt for File Names
32903 CSS9 N2 Fan 4040 8-8 NDE Fan	T
Select All Clear All	Export Data
Directory where data files will be stored	

• **Export Data Button** – activate to export the data

(-

Figure 90 – Echo[®] Sensor Data Export Utility Screen

4.2.13 DSP Status

The Digital Signal Processor (DSP) status utility is used to check for situations where the sensor signal received by the junction box fluctuates outside the allowed threshold established for measurement consistency. If the DSP processor encounters problems with the stability of the data sets it captures from the sensor it will set status bits in the transmission indicating a DSP alarm condition. The alarm conditions are as follows;

- 0= Passed first 3 samples
- 1= Passed without re-transmit, but not on first 3 samples
- 2= Retry completed and passed
- 3= Retry completed and failed

The DSP alarm screen, shown in Figure 91, is used to query the database to see where, if at all, this is happening. If sensors show up with a status of 3 or you find many instances where the alarm is greater than 0, the sensor and ground should be checked. This query can be run on all transmission records (check the **All Records** box) or over a certain time period (clear the **All Records** checkbox and set the time parameters). The **Remove Duplicates** checkbox is used to remove multiple table entries for the same channel. Checking it will show just the most recent transmission with a problem. Using it is a good way to get an overall picture of how many channels are having a problem.

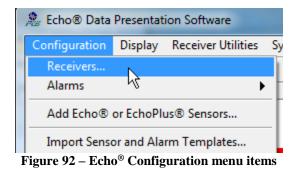
NOTE: If a transmission is received with a DSP status of failure (3) and ZeroDSPFail is set to TRUE in the **PCB EchoReceiver.ini** file then the transmission is saved in a log file named **DSPic Alerts.txt** in the 'Data' directory and the values are zeroed before entry in the database.

Start Time	Channel	Time	Alarm	
9:31:25.782 AM	33248 Sheet LN #2 DC D104(A) Motor OB Brg. 1H (4)	2016-12-07 10:12:50	3	1
12/3/2016	33249 Sheet LN #2 DC D104(A) Motor OB Brg. 1V (4)	2016-12-07 10:12:57	3	
	33250 Sheet LN #2 DC D104(A) Motor IB Brg. 2H (4)	2016-12-07 10:13:05	3	
itop Time	33251 Sheet LN #2 DC D104(A) Motor IB Brg. 2V (4)	2016-12-07 10:13:13	3	
9:31:25.782 AM	33252 Sheet LN #2 DC D104(A) Blower IB Brg. 3H (4)	2016-12-07 10:13:20	2	
/4/2017	33253 Sheet LN #2 DC D104(A) Blower IB Brg. 3V (4)	2016-12-07 10:13:28	3	
_	33254 Sheet LN #2 DC D104(A) Blower OB Brg. 4H (4)	2016-12-07 10:13:36	1	
All Records	33255 Sheet LN #2 DC D104(A) Blower OB Brg. 4V (4)	2016-12-07 10:13:43	3	
Remove Duplicates	33256 Sheeting A Supply Fan (AWU-17) Motor OB Brg. 1H (6)	2016-12-07 09:47:21	1	
, nemore bupneares	33257 Sheeting A Supply Fan (AWU-17) Motor OB Brg. 1V (5)	2016-12-07 09:47:28	3	
P Status to query	33258 Sheeting A Supply Fan (AWU-17) Motor IB Brg. 2H (6)	2016-12-07 09:47:36	3	
II (1,2,3) 💌	33259 Sheeting A Supply Fan (AWU-17) Motor IB Brg. 2V (6)	2016-12-07 09:47:44	3	
	33260 Sheeting A Supply Fan (AWU-17) Fan IB Brg. 3H (6)	2016-12-07 09:47:52	3	
	33261 Sheeting A Supply Fan (AWU-17) Fan IB Brg. 3V (6)	2016-12-07 09:47:59	3	
	33262 Sheeting A Supply Fan (AWU-17) Fan OB Brg. 4H (6)	2016-12-07 09:48:07	3	
	33263 Sheeting A Supply Fan (AWU-17) Fan OB Brg. 4V (6)	2016-12-07 09:48:15	3	
	33264 2nd Floor Supply Fan (A) Motor OB Brg. 1H (8)	2016-12-08 06:54:23	2	
	33265 2nd Floor Supply Fan (A) Motor OB Brg. 1V (7)	2016-12-08 06:54:31	1	
	33266 2nd Floor Supply Fan (A) Motor IB Brg. 2H (6)	2016-12-08 06:54:39	3	
Print	33267 2nd Floor Supply Fan (A) Motor IB Brg. 2V (7)	2016-12-08 06:54:47	3	
	33268 2nd Floor Supply Fan (A) Fan IB Brg. 3H (8)	2016-12-08 06:54:54	3	

Figure 91 – Echo® DSPic Alarm Query Dialog

X

4.2.14 Main Screen Features



4.2.14.1 Receiver Connection Parameters

Receiver Parameters			
Receiver Name	IP Address	^	
PC8 Echo 1	192.168.0.10		
SQL Server UDL Path			
C:\PCB\Echo\Databas	se\EchoDataSQL.udl	>	
Receiver Name	IP Address		
PCB Echo 2	192.168.0.10		
SQL Server UDL Path			
C:\PCB\Echo\Databa	se\EchoDataSQL.udl		
Receiver Name	IP Address		
	localhost		
SQL Server UDL Path			
Receiver Name	IP Address		
	localhost		
SQL Server UDL Path			
		i 🗁 🗸	
2 # Receivers	SQL Interfac	e Enable 🗹	

Figure 93 – Echo® Receiver Connections

This section describes the parameters used to connect to a receiver. To change these values select **Configuration** | **Receivers**... from the menu bar. This will bring up the Receiver Configuration screen shown in Figure 93.

The Receiver parameters consist of the 3 items;

- **Receiver Name** This provides a unique identifier for a receiver. You may name it anything you like. This name will appear in the title of many subsequent screens associated with data transmitted by this receiver.
- IP Address In order to connect to a receiver, the receivers IP address must be ascertained and entered here. The procedure for setting a receivers IP address is described in Section 4.2.14.2. The receivers are set up to dynamically receive an IP address assignment from the network's DHCP server at the factory. In the event no assignment is made the receiver will likely default to an address of 169.254.nnn.nnn where the nnn octets are randomly assigned. There are two methods to determine a receivers IP address;
 - The preferred method is to run the Echo[®] Receiver Discovery Tool (Receiver Utilities | Find Echo Receivers...) from the main menu bar Figure 94. The screen shown in Figure 95 below will appear. Clicking 'Search' should reveal the Echo[®] receivers, their assigned IP address and their internal unit ID. Enter the IP address seen here in the IP Address field of the Echo[®] Receiver Connection Parameters found on the main Echo[®] software screen. The ID is marked on the receiver itself so positive identification can be made. The utility will start with the 1st 3 octets set to the same values as the PC's IP address and 255 in the last one. If this fails to find the receiver then change the 3rd octet to 255 and try again.

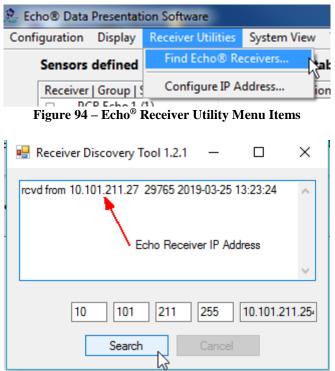


Figure 95 – Echo[®] Receiver Discovery Utility

In the event the Discovery utility fails, the supplied serial cable can be connected to the unused power/serial connector on the receiver and the other end to a laptop. Running a terminal emulation program such as HyperTerminal (Figure 96) with the serial parameters set to; Baud=38400, 8 data bits, no parity and 1 stop bit. This will show a data stream that is continually output and contains the IP address³.

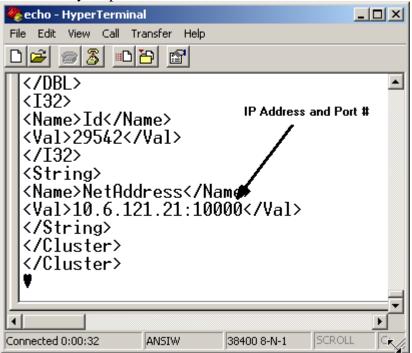


Figure 96 – Echo[®] Receiver IP determination using the serial port

• **SQL Server UDL Path** – The UDL File path is required if the Echo[®] transmissions are to be stored in an SQL database. This provides the connection between the application and the database engine. The UDL file configured in section 3.4 is identified here⁴.

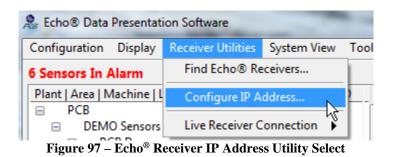
The Receiver Connection Parameters determine which physical receiver is being viewed when the 'Live Data' button is activated and what database is being queried by the other button functions.

4.2.14.2 Setting the Receiver IP Address

The Echo[®] Receiver IP address can be setup to be dynamically assigned or configured with a static assignment (recommended). To configure the IP address, connect the Receiver to the PC using the supplied serial port cable, and then select the menu option Receiver Utilities | Configure IP Address shown in Figure 97.

³ The software connects to the receiver at the specified IP address using port 10000

⁴ There may be multiple UDL files. Each receiver can store data to a separate database if desired.



When activated the screen shown in Figure 98 will appear. If you want the DHCP server on your network to assign an IP address to the receiver automatically when the receiver powers up then select the Dynamic option shown below and activate the Apply Update button. Changes made to the receiver will take approximately 30 seconds to complete. When complete the **Success** status light will illuminate.

🙈 Recv IP Change 3.1	- 🗆 ×
Receiver Status Running Receiver ID: 29765 Operating System: 01.00.000.000 Receiver Executable: 03.00.007.001	Serial Port COM4 Update Status Success Failure
Current Configuration State Dynamic State 10.101.211.27 IP Add 255.255.255.0 Subnet 10.101.211.1 Default Query Receiver Subnet	dress
<string> <name>NetAddress</name> <val>10.101.211.27:10000:1</val> </string> 	Serial Port Output Window
1 Band Selection	1 Apply Update
Q	uit

Echo[®] Monitoring Software User's Manual

Figure 98 – Echo[®] Receiver IP Address Configuration Utility – Dynamic Example

To set a static IP address on the receiver then select the Static option and fill in the IP address parameters as shown in Figure 99 below. Next activate the Apply Update button and wait for the assignment to complete (~30 seconds). When complete the fields on the left will reflect the new assignment and the Success light should be lit.

🚓 Recv IP Change 3.1		_	- 🗆 X
Receiver Status Running Receiver ID: 29765 Operating System: 01.00.000.000 Receiver Executable: 03.00.007.001	Upd	rial Port COM4 ate Status uccess Failur	re
Current Configuration Static 192.168.0.100 255.255.255.0 0.0.0.0 Query Receiver	State IP Address Subnet Mask Default Gateway	Dynamic Static () 192.168.0.100 255.255.255.0 0.0.0.0 Apply Update	2
<name>NetAddress</name> <val>192.168.0.100:10000:1</val> 	Serial Por	t Output Window	~
	Quit		

Figure 99 – Echo[®] Receiver IP Address Configuration Utility – Static Example

Band Selection – You must coordinate the transmission band selection between the sensor(s) and the receiver. The default for both sensors and receivers is band 1. For 916 MHz systems (US, CA etc.) there are 12 band selections. For 868 MHz systems (EU) there are 9.

Serial Port Output - The center of the screen displays the output of the receiver's serial port. This is useful for troubleshooting purposes.

4.2.14.3 Live Data Screen

The Echo[®] Data Presentation software provides a mechanism to see all transmissions received by each receiver. To access these screens select **Receiver Utilities** | **Live Receiver Connection** from the main screen menu bar and select the receiver of interest.

🧏 Echo® Data Presentati	ion Software	18.00		-	100	
Configuration Display	Receiver Utilities	System View	Tools	Administration	Help	
6 Sensors In Alarm	Find Echo® Re	ceivers			32897 RMS Velocity	y IPS
Plant Area Machine L	Configure IP Address		<u>}^</u>	0.2-		
DEMO Sensors	Live Receiver C	onnection 🔸	PCE	Echo 1 10.6.121	.23 EchoDataSQL.udl	6
PCB Demo			PCE	Echo 2 10.1.121	.219 EchoDataSQL.udl	N
	Figure 100	Febo [®] Docoiv	or Livo	data coroon		

Figure 100 – Echo[®] Receiver Live data screen

Activating this menu item brings up the window shown in Figure 101. The *PCB Echo Receiver Client screen* is used to see all transmissions that the receiver collects regardless of whether the sensor is registered with that receiver in the database or not. This is the only screen that shows <u>all</u> transmissions being captured by a receiver. All others will only show data for sensors configured for the receiver. (e.g. Two Echo[®] sensors may both be in range of two receivers. Both receivers will pickup the transmissions but the receiver's client service will only store the transmission in the database if the sensor is configured for that receiver.)

When a connection has been made the fields at the top of the screen will look similar to the ones shown in Figure 101. The **LED** will be green, the **Noise** field will display some value and the **ID** field will contain the receiver ID and the IP address the port number and the reception band of the connection. As sensor transmissions are received the data will show up in the table below with the most recent transmission at the top and the oldest at the bottom. This screen will only show the most recent 50 transmissions. Which data items and what order the data is displayed in can be customized using the method discussed in section 4.2.8.

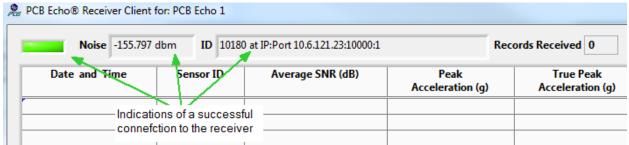


Figure 101 – Echo® Receiver Client Screen with a Receiver Connection

At the bottom of the Receiver Client screen is a 'Log Transmissions to File' check box. If this box is checked two additional controls will appear; 'Insert Break' and a text field to type a comment. When the 'Log transmissions' box is checked every transmission

received will be logged in a file named 'Echo Log R<x> <mm-dd-yy hh-mm-ss>.txt'. Where <x> is the receiver number and the rest is the date & time. Click the 'Insert Break' button to insert a break (<CR><LF>) in the Log file. The break will be a blank line or whatever text is contained in the 'Comment' control to the right. This breaks up the stream of transmission records and provides annotation for testing the system. Every time this box is checked a new break is inserted. The log file is useful when doing surveys to determine the best receiver placement. Note: A new file is generated every time the Log Transmission box is toggled.

1		
Status	Waiting for transmission	Clear Table V Log Transmissions to File
	Figure 102 – Echo®	Receiver Client Screen Log File Controls

4.2.14.4 Sensor List short-cut Menu Functions

To access additional screens like the transmission history screen and the advanced plot screen simply right-click on the main screen sensor tree and select an option. Generally the screen will display for the selected sensor.

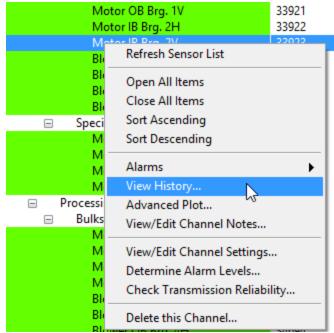


Figure 103 - Main Screen Sensor Tree Short Cut Menu to other Screens and Functions

4.2.14.5 Historical Data Screen

Activation of the Historical Data button on the main screen brings up the screen shown below in Figure 104. This screen has the following controls:

- Sensor Select. Clicking on this control reveals a list of all sensors assigned to this receiver. Selection of a sensor in the list will cause all stored data transmissions for that sensor to be displayed.
- Left & Right Arrow Buttons These provide a quick method to scroll through the data. They move the Sensor Select to the next or previous sensor and plot its data automatically.
- **Update Frequency.** This controls the frequency, in minutes, at which the screen is updated from the database.
- **Trend Plot** button. Activation of this button brings up the screen shown in Figure 109 which provides a graphical representation of the data and the ability to compare it with other sensors.

3/12/2019 2:58:06 PM 3/12/2019 6:58:07 AM 3/11/2019 10:58:08 PM 3/11/2019 2:58:09 PM 1/10/2019 10:58:11 PM *	34898 34898 34898 34898 34898 34898	38 33 39	0.127	0.180		Acceleration (g)	Acceleration (g)	Factor	Status	Status
3/12/2019 10:58:05 PM 3/12/2019 2:58:06 PM 3/12/2019 6:58:07 AM 3/11/2019 10:58:08 PM 3/11/2019 2:58:09 PM 3/10/2019 10:58:11 PM * 3/10/2019 2:58:13 PM	34898 34898		0.120	0.180	0.975	1.379	4.997	5.125	3	3
3/12/2019 6:58:07 AM 3/11/2019 10:58:08 PM 3/11/2019 2:58:09 PM 1/10/2019 10:58:11 PM *	34898	30	0.128	0.181	0.975	1.379	5.180	5.312	3	3
3/11/2019 10:58:08 PM 3/11/2019 2:58:09 PM 3/10/2019 10:58:11 PM *			0.137	0.194	0.965	1.365	6.695	6.937	3	3
3/11/2019 2:58:09 PM /10/2019 10:58:11 PM *	34898	41	0.140	0.198	0.950	1.343	5.878	6.187	3	3
/10/2019 10:58:11 PM *		38	0.143	0.202	0.945	1.336	4.902	5.187	3	3
	34898	37	0.138	0.195	0.925	1.308	4.683	5.062	3	3
3/10/2019 2:58:13 PM	34898	33	0.123	0.174	0.965	1.365	5.368	5.562	3	3
	34898	46	0.124	0.175	0.965	1.365	5.187	5.375	3	3
3/10/2019 6:58:13 AM	34898	45	0.127	0.180	0.950	1.343	4.869	5.125	3	3
3/9/2019 9:58:14 PM	34898	41	0.146	0.206	0.915	1.294	4.861	5.312	3	3
3/9/2019 5:58:16 AM *	34898	41	0.143	0.202	0.920	1.301	4.485	4.875	3	3
3/8/2019 9:58:17 PM	34898	39	0.146	0.206	0.895	1.266	4.475	5.000	3	3
3/8/2019 1:58:18 PM	34898	44	0.140	0.198	0.880	1.244	4.565	5.187	3	3
3/8/2019 5:58:19 AM	34898	44	0.142	0.201	0.870	1.230	4.459	5.125	3	3
3/7/2019 9:58:20 PM	34898	32	0.140	0.198	0.865	1.223	4.433	5.125	3	3
3/7/2019 1:58:21 PM	34898	43	0.138	0.195	0.860	1.216	4.354	5.062	3	3
3/7/2019 5:58:22 AM	34898	39	0.139	0.197	0.860	1.216	4.407	5.125	3	3
3/6/2019 9:58:23 PM	34898	35	0.133	0.188	0.875	1.237	4.539	5.187	3	3
3/6/2019 1:58:24 PM	34898	42	0.124	0.175	0.915	1.294	4.861	5.312	3	3
3/6/2019 5:58:25 AM	34898	42	0.134	0.190	0.850	1.202	4.303	5.062	3	3
3/5/2019 9:58:26 PM	34898	44	0.132	0.187	0.860	1.216	4.569	5.312	3	3
3/5/2019 1:58:27 PM	34898	48	0.136	0.192	0.860	1.216	4.407	5.125	3	3
3/5/2019 5:58:28 AM	34898	45	0.136	0.192	0.855	1.209	4.435	5.187	3	3
3/4/2019 9:58:28 PM	34898	44	0.132	0.187	0.855	1.209	4.222	4.937	3	3
3/4/2019 1:58:30 PM	34898	44	0.135	0.191	0.910	1.287	4.607	5.062	3	3
3/4/2019 5:58:31 AM	34898	42	0.140	0.198	0.855	1.209	4.275	5.000	3	3
3/3/2019 9:58:33 PM	34898	42	0.127	0.180	0.865	1.223	4.758	5.500	3	3

Figure 104 – Echo[®] Historical Sensor Data Screen

4.2.14.5.1 Maintaining Transmission Records

Transmission data can be marked for saving or deleted from the database from this screen. To access this screen click the menu bar, shown in Figure 105 and select 'Maintenance' which will bring up the screen shown in Figure 106 below.

Page Historica	ai Data fol	ina in: Ec	noDataSQL.udi			
Sensor Data	Channel Notes					
Plot		ne	Sensor ID	Ave		
Save to Fil		iie iii	Sensor ID	SNI		
Print Table	e	5 AM	34898			
Maintenar	nce	05 PM	34898			
	~ ~ ~ ~ ~ ~ ~ ~ ~	6 PM	34898			

🧏 Historical Data found in: EchoDataSQL.udl

Figure 105 – Echo[®] Historical Sensor Data Screen Menu bar

ransmissio	n Table								
ld	DateTime	Save Flag Set	RMS Velocity (ips)	Peak Velocity (ips)	RMS Acceleration (g)	Peak Acceleration (g)	True Peak Accel (g)	Crest Factor	Note
2402201	6/6/2018 12:38:57 AM	No	0.096	0.1357632	0.505	0.714171	2.114687	4.1875	
2401548	6/5/2018 4:39:00 PM	No	0.095	0.134349	0.49	0.692958	2.051875	4.1875	
2400885	6/5/2018 8:39:01 AM	No	0.091	0.1286922	0.505	0.714171	2.177813	4.3125	
2400249	6/5/2018 12:39:01 AM	No	0.092	0.1301064	0.515	0.728313	2.349687	4.5625	
2399607	6/4/2018 4:39:01 PM	No	0.094	0.1329348	0.505	0.714171	2.177813	4.3125	
2398958	6/4/2018 8:39:03 AM	No	0.091	0.1286922	0.505	0.714171	2.14625	4.25	
2398303	6/4/2018 12:39:02 AM	No	0.092	0.1301064	0.505	0.714171	2.051563	4.0625	
2397655	6/3/2018 4:39:04 PM	No	0.091	0.1286922	0.51	0.721242	2.23125	4.375	
2397009	6/3/2018 8:39:05 AM	No	0.092	0.1301064	0.515	0.728313	2.092187	4.0625	
2396363	6/3/2018 12:39:06 AM	No	0.092	0.1301064	0.505	0.714171	2.083125	4.125	
2395735	6/2/2018 4:39:06 PM	No	0.092	0.1301064	0.485	0.685887	2.030938	4.1875	
2395087	6/2/2018 8:39:07 AM	No	0.000	0 1201064	2.5	0.7071	2.125	4.25	
2394468	6/2/2018 12:39:07 AM	No	Delete Selected Tra	nsmissions	1.445	0.629319	1.78	4	This is a channel note
2393805	6/1/2018 4:39:10 PM	No	Delete All Transmis	sions	.455	0.643461	1.990625	4.375	
2393167	6/1/2018 8:39:11 AM	No			.49	0.692958	1.990625	4.0625	
2392535	6/1/2018 12:39:09 AM	No	Transfer Data to a R	leplacement Sensor	.495	0.700029	2.041875	4.125	
2391887	5/31/2018 4:39:12 PM	No	Set Save Flag(s)		.485	0.685887	2.06125	4.25	
2391247	5/31/2018 8:39:13 AM	No	Clear Save Flag(s)		.485	0.685887	2.000625	4.125	
2390585	5/31/2018 12:39:14 AM	No –	cical save risg(s)		.49	0.692958	1.929375	3.9375	
2389925	5/30/2018 4:39:14 PM	No	Cancel		.48	0.678816	1.95	4.0625	
2389205	5/30/2018 8:39:16 AM	No	0.092	0.1301064	0.485	0.685887	1.94	4	
2388568	5/30/2018 12:39:17 AM	No	0.089	0.1258638	0.495	0.700029	2.041875	4.125	
2387925	5/29/2018 4:39:16 PM	No	0.091	0.1286922	0.485	0.685887	2.000625	4.125	
2387277	5/29/2018 8:39:19 AM	No	0.092	0.1301064	0.485	0.685887	2.030938	4.1875	
2386616	5/29/2018 12:39:19 AM	No	0.088	0.1244496	0.5	0.7071	2.03125	4.0625	
2385976	5/28/2018 4:39:20 PM	No	0.09	0.127278	0.49	0.692958	1.990625	4.0625	
2385342	Select a start and Stop select		0.088	0.1244496	0.515	0.728313	2.06	4	
2384698	Or use the cursor and drag ac to select records to delete	cross the table	0.087	0.1230354	0.51	0.721242	2.10375	4.125	
<	to acreat records to delete		1	1	1	1			~
Sensor Se 35616 3 Selection S 8:11:36.78	rd Floor AWU Supply Fan	Selection		2) Use the left Mo OR use Selectio 3) Next right click	on Start & Selection Sto on the table and select	n history g) to select transmission p to select a date/time the desired operation. save flag for a transmiss	range.	R	nsmission emoval Utility

Echo® Monitoring Software User's Manual

Figure 106 – Echo® Sensor Transmission Maintenance Screen

To delete transmissions drag the mouse across the table to select the records to be deleted. The selected records will highlight in blue as shown above. Next right click on the table and select the operation to perform. The **Delete Selected Transmissions** option will only delete the highlighted records. Selecting **Delete All Transmissions** will delete all of the records for the selected sensor. Selection of either option will cause a verification dialog to appear before the action is taken.

From this screen the data from any sensor assigned to the receiver can be deleted by selecting the desired sensor from the **Sensor Select** control. Additionally, specific time periods can be selected within the displayed data by editing the **Selection Start** and **Selection Stop** controls. Alternatively large data sets of transmissions, from multiple sensors, can be removed from the database by activating the **Transmission Removal Utility**. See section 0.

Set Save Flag is a feature to ensure a specific transmission is not deleted even if it is in the selection of records to delete. Additionally this will protect a transmission from deletion if it would ordinarily be deleted by the function that deletes older records if the 'Max Transmissions to Store' value in the sensor setup table is not set to 'All' transmissions (0). When set the value in the 'Save Flag Set' will be 'Yes', if not set the value will be 'No'. To clear the Save flag select the **Clear Save Flag** option.

4.2.14.5.2 Transmission Removal Utility

The transmission removal utility allows a user to delete a large number of transmissions for one or many channels by setting a few parameters and clicking the Delete Sensor Data button.

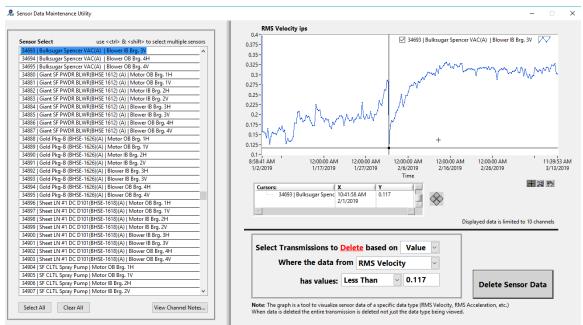


Figure 107 – Echo® Transmission Removal Utility Screen

To use this feature select as many sensors from the **Sensor Select** control on the left of the screen as necessary. Selection of sensors will display data, for the selected data type, in the graph on the right. Up to 10 channels can be viewed in the graph.

Next, select deletion by Value or Time from the Value/Time control. If Value is selected then select Less Than or Greater Than as the criteria and a value to complete the instruction. If Time is selected then start and stop time controls will appear in place of the value controls so a time period, or, all data, can be selected. When all parameters are set click the Delete Sensor Data button to complete the task.

Activating the **View Channel Notes** brings up the Channel Notes Viewer display (Figure 63)

Note: The Data Type control is only used to display data in the graph for use as a visual aid. When a transmission is deleted from the database <u>the entire transmission (velocity, acceleration, crest factor etc.) is deleted.</u>

4.2.14.5.3 Saving Transmission Records to a File

Selecting the **Save to File** option from the **Historical Data** screen menu bar will cause the data shown for the selected sensor to be saved to a comma delimited spreadsheet file. The data can then be viewed outside this application.

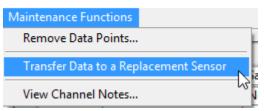
4.2.14.5.4 Print Transmission Records

Selecting the **Print Table** option from the **Historical Data** screen menu bar will cause the data shown for the selected sensor to be printed on the default printer.

4.2.14.5.5 Transfer Transmission Records to a Replacement Sensor

A sensors transmission records can be transferred to another sensor by rt-clicking on the table and selecting the Transfer Data to a Replacement Sensor option or by selecting the menu option shown below. This may be necessary if a sensor is replaced for some reason and you want to keep the monitored points history.

Sensor Transmission Maintenance



Selecting the Transfer Data to a Replacement Sensor option will display the screen shown in Figure 108. In this screen select the Sensor to transfer the data to and, if all transmissions are to be transferred, also check the Transfer All Transmissions box. If this box is not checked then only the transmissions selected in the previous screen will be transferred.

NOTE: The sensor the transmissions are being transferred to MUST already exist in the database. Additionally the transmissions will no longer exist for the original sensor.

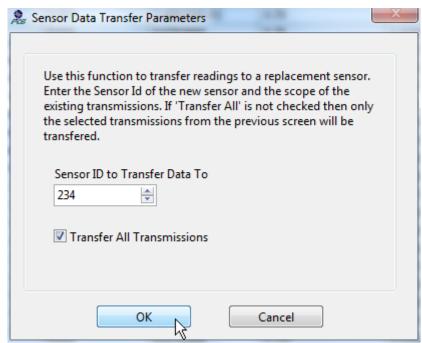


Figure 108 – Echo® Transfer data to a replacement sensor Screen

4.2.14.5.6 Trend Plot Display Screen

Activation of the Trend Plot button from the history screen will bring up the display shown in Figure 109 below. This action will also occur if the **Plot...** option from the **Historical Data** screen menu bar is selected or the **Advanced Plot...** item is selected from the main screen Channel List short cut options.

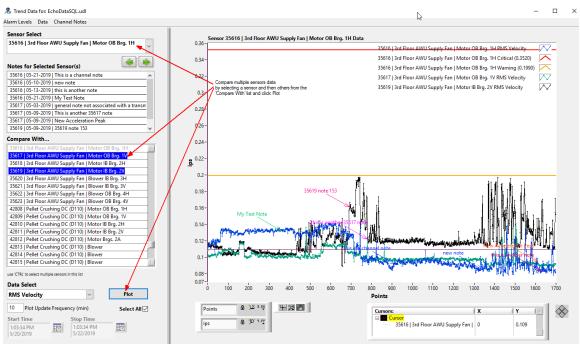


Figure 109 – Echo[®] Sensor Data Trend Screen

The data trend screen provides a graphical representation of the selected data type over a selectable period of time. Additionally other sensors data, of the same type, can be compared in the same screen. The following paragraphs explain the data selection controls at the bottom right of the display.

- Sensor Select This selects the primary sensor for which data will be displayed. This sensors alarm limits for the selected data type will also be displayed on the graph. When this value changes the new data for the specified data type and time period will automatically display
- Left & Right Arrow Buttons These provide a quick method to scroll through the data. They move the Sensor Select to the next or previous sensor and plot its data automatically.
- Notes for Selected Sensor(s) any notes created for the selected sensors will be displayed in this list. The notes are also displayed on the graph if the note display is not disabled.
- **Compare With** This control allows you to select other sensors to display with the main sensor selection. Multiple sensors can be selected from it by holding the <ctrl> key while you click on sensor entries. Once selected click on the Plot button to update the graph. To unselect an entry by just clicking on it again. An

easy way to unselect all entries is to select the disabled (dimmed) entry which represents the main sensor selection.

- **Data Select** this control specifies what data value from each transmission will be displayed. When this value changes the new data for the specified sensor and time period will automatically display.
- **Plot Update Frequency** this control determines how often, in minutes, the displayed data will be refreshed from the database.
- Start & Stop Time These controls allow the selection of a subset of data for a specific period of time to be displayed. After selecting a new time period, activate the Plot button to update the graph (see Figure 110). When the screen is entered this control will be set to the last 2 days of data.
- Select all Clicking this check box causes the Start & Stop Time controls to be ignored and all data for the sensor is displayed.
- Plot Button Activate this to update the graph to reflect recent selection changes.

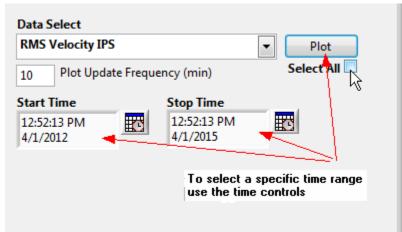


Figure 110 – Echo[®] Sensor Data Trend Screen Data Selection Fields

This screen also features graph controls that are useful for zooming in on the displayed data and moving a cursor around to identify the data values of specific points on the graph. Figure 111 below shows the location of these controls on the screen. To control the cursor click on the Cursor select tool and then place the mouse pointer over the cursor on the screen and click and drag the cursor to the desired position. The data values are displayed in the cursor indicator on the bottom left of the screen. Additional controls are available by right clicking on the cursor item itself, shown in yellow below. Use it to center the cursor or to select the sensor data it should be associated with (snap to).

Cursors:			
	Visible Items	►	iur
	Snap To	۲	-
	Attributes	•	
	Bring to Center		
	0.1.0	V	15
Cursors:			All Plots
⊡· <mark>■ •</mark>	Visible Items	►	✓ 35616 3rd Floor AWU Supply Fan Motor OB Brg. 1H RMS
	Snap To	►	35616 3rd Floor AWU Supply Fan Motor OB Brg. 1H Critic 35616 3rd Floor AWU Supply Fan Motor OB Brg. 1H Warn
	Attributes	►	35617 3rd Floor AWU Supply Fan Motor OB Brg. 1V RMS V
	Bring to Center		35619 3rd Floor AWU Supply Fan Motor IB Brg. 2V RMS V

These tools are especially useful when assigning a note to the data.

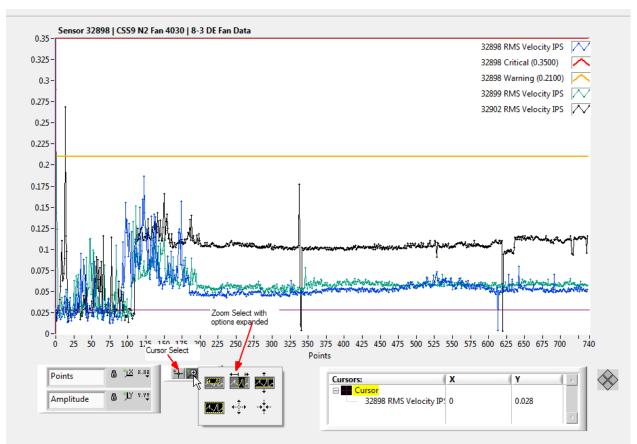
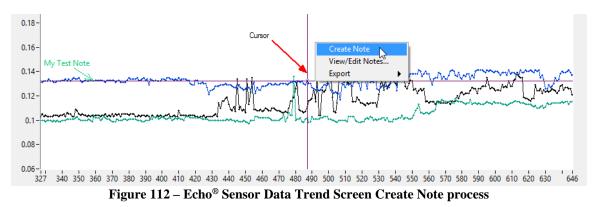


Figure 111 – Echo[®] Sensor Data Trend Screen Graph Tools

Also shown in Figure 111 is the zoom tool. Clicking on it will display the sub menu shown that allows you to select the type of zoom desired. Clicking on the 'x' or 'y' icons below the tools will restore the graph to its original scale.

To assign a channel note to the data use the cursor and zoom tools described above to position the cursor on the data point that is to be annotated. Next, right click on the graph and select the Create Note option. This will start the note creation process described in section 4.2.9.



Additional graph menu items provide a short cut to the Channel Note viewer and several data Export functions for transferring data in image or spreadsheet file formats.

The menu bar on the Trend Data screen, shown in Figure 113, provides access to the Alarm Level screen shown in Figure 114 that allows you to change the alarm levels easily for the displayed sensor and data type and the Data Deletion utility screen shown in Figure 116. The Channel Note options provide the capability to;

- Clear the displayed notes
- Disable displaying the channel notes
- View/Edit the Channel Notes (Figure 63)

Activating the Print option provides a printout of the graph as it is shown on the screen.



🧏 Trend Data for: EchoDataSQL.udl

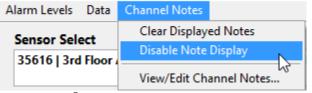


Figure 113 – Echo[®] Sensor Data Trend Screen Menu bar options

4.2.14.5.7 Change Alarm Levels Screen

g Change Alarm	Levels Dialog		×
42 Mar	new Warning and Cr k XP Laptop : ocity IPS	itical Alarm Levels for:	
	Warning Level	Critical Level	
	(OK Can	cel

Figure 114 – Echo[®] Change Alarm Level Dialog Screen

The sensor whose alarm is being changed and the data type that the alarm applies to is shown in the text entry at the top of the screen. The two numeric controls will initially show the current critical and warning alarm values. These can be changed to different values if necessary. Clicking the OK button will save them in the database and cause the verification dialog shown in Figure 115 to be displayed. The Cancel button exits the window with no change.



Figure 115 – Echo[®] Change Alarm Confirmation

4.2.14.5.8 Echo[®] Data Deletion Utility Screen

🤹 Edit Sensor Data Set Dialog		
Remove data from Sensor:	66 Marks Desk2	
Where the data type:	RMS Velocity IPS	
Has values:	Less Than 💌	0.0500
	✓ Less Than	
	Greater Than Delete	Close
	43	

Figure 116 – Echo® Data Deletion utility screen

This utility provides a way to remove unwanted data from the database that is either greater than or less than a specified threshold. To use this function; select the sensor of interest and the data type that the threshold will refer to. Next set the less than or greater than operation and the threshold value and click the **Delete** button.

Note: the delete action will remove the entire transmission record from the database so the other data type values for this sensor transmission will be deleted as well.

After this action is taken the data on the calling screen will be redisplayed to reflect the change in data.

The **Close** button or top right X will close the screen

4.2.14.5.9 Sensor Status Screen

Activation of the Sensor Status button on the main screen brings up the screen shown below in Figure 117 and Figure 118. This screen shows an at-a-glance view of the battery status, RF/Power status and whether the sensor is reporting data on schedule. Above the status table is a message indicator to warn of any battery issues that exist for sensors assigned to the specified receiver. The messages reflect the designations for battery status described below.

Status for: PCB Echo 2		(2
ort Item				
Warning: Replace Batteries wi	th 1 diamo	ad Immediate	she	T
Warning, Replace batteries wi	un i utanitu		-'y	
Sensor	Battery	RF/Power	Data	2
32848 CP4 R1 Ex Pump 2240	•	****		
91 CSS 13 Cryst Recirc Fan 0	****	***		
97 CSS 13 Cryst Recirc Fan II	****	****		
100 CSS 12 Cryst Recirc Fan	****	****		
101 CSS 12 Cryst Recirc Fan	****	****		
111 D&E Transfer Blower DE	****	****		
125 D&E Transfer Blower ND	****	****		
32832 CP3 R1 A Ex Pump 2240	****	****		
32833 CP3 R1 A Ex Pump 2240	****	****		
32834 CP3 R1 A Ex Pump 2240	****	***		
32835 CP3 R1 A Ex Pump 2240	****	****		
32836 CP3 R1 B Ex Pump 2241	****	****		
32837 CP3 R1 B Ex Pump 2241		****	0 X	

Figure 117 – Echo[®] Sensor Status Screen - Replace Battery

Status for: PCB Echo 1				X
Sort Item				
Warning: Batteries with 2 dia	monds are	manufactures la secola		
warning, batteries with 2 are	imonus are	marginai, repi	ace soon	
Sensor	Battery	RF/Power	Data	
				<u> </u>
Sensor			Data	A

Figure 118 – Echo[®] Sensor Status Screen - Replace Battery Soon

Battery Status

- 1 red diamond means the battery is poor replace battery immediately
- 2 yellow diamonds mean the battery is low replace soon, battery is marginal
- 3 green diamonds mean the battery is good however you should order a battery
- 4 green diamonds mean the battery is excellent no action required

RF/Power Status

- 1 red diamond means average SNR was less than 15dB.
- 2 yellow diamonds mean average SNR was 15dB to 20dB.
- 3 green diamonds mean average SNR was 20dB to 25dB.
- 4 green diamonds mean average SNR was over 25dB.
- 4 orange diamonds mean average transmission power was over -65dBm. This supersedes the SNR-based definitions.

Data Transmission Frequency

The icons in this field are either;

Echo® Monitoring Software User's Manual

- Green the sensor transmissions are being received on schedule.
- Red a transmission has not been received for the number of transmissions specified in the 'missed transmission count' field of the database entry for the sensor.

Battery ✓ Ascending Descending Pe but order replacements Data Battery RF/Power Data 42 Echo PCB-CA Ascending COME 32808 Echo Plus PCB-CA Ascending COME 32809 Echo Plus PCB-CA Ascending COME 32809 Echo Plus PCB-CA Ascending COME 32810 Echo Plus PCB-CA Ascending COME 32811 Echo Plus PCB-CA Ascending COME 32812 Echo Plus PCB-CA Ascending COME 32813 Echo Plus PCB-CA Ascending COME 32814 Echo Plus PCB-CA Ascending COME 32814 Echo Plus PCB-CA Ascending COME	ort Item				
RF Descending Data Battery RF/Power Data 42 Echo PCB-CA Image: Complex of the second secon	Battery	↓ Ascending	Neter		
42 Echo PCB-CA Image: Algorithm of the second seco	RF	 Descending 	V2 e put o	rder replacem	lents
32808 EchoPlus PCB-CA Image: Constraint of the second state of the second st	Data	•	Battery	RF/Power	Data 🔺
66 Echo PCB-CA Image: Constraint of the sector of	42 Echo	PCB-CA	***	****	08
32809 EchoPlus PCB-CA Image: Constraint of the second sec	32808 Ec	hoPlus PCB-CA	***	****	0 🗵
32810 EchoPlus PCB-CA Image: Comparison of the compa	66 Echo	PCB-CA	****	****	0×
32811 EchoPlus PCB-CA Image: Complex in the second	32809 Ec	hoPlus PCB-CA	****	****	0×
32812 EchoPlus PCB-CA ◆◆◆◆ ● IX 32813 EchoPlus PCB-CA ◆◆◆◆ ● IX	32810 Ec	hoPlus PCB-CA	****	****	0×
32813 EchoPlus PCB-CA	32811 Ec	hoPlus PCB-CA	****	****	0×
	32812 Ec	hoPlus PCB-CA	****	****	0 X
32814 EchoPlus PCB-CA	32813 Ec	hoPlus PCB-CA	****	****	0 X
	32814 Ec	hoPlus PCB-CA	****	****	0

Figure 119 – Echo[®] Sensor Status Screen Menu Bar Options

The sensor status screen can be set up to display the data for any item in ascending or descending order to highlight which sensors are fine and which may be experiencing a problem (Figure 119). To set this up click on the **Sort Item** entry on the menu bar then the data type and whether to display it in ascending or descending order.

4.2.15 System Level Alarm & Status Screens

Selecting System View | Alarms... or System View | Sensor Status... from the main screen menu bar will bring up screens described below. These system level screens display entries for all receivers contained in a single Echo[®] database.

& Echo® Data Presentation Software								
Configuration Display Receiver Util	Configuration Display Receiver Utilities							
Sensors defined in the select	Alarms	N		1				
		Sensor Stat	us					
Receiver Group Sensor ID	Ma							
32846	32846 CP.							
Eigung 120 Esho	® C			100 L 1 0 M	DF D			

Figure 120 – Echo[®] System View Options

If multiple databases are in use the operator will be prompted to select which database to use for the system view.

4.2.15.1 System Alarm Screen

This screen shows the current sensor alarm status for the selected database and refreshes at the rate configured in the Preferences screen. The summary tab display shows a color coded status of all sensors assigned to the indicated receiver. The coding is as follows;

- Red A **CRITICAL** level alarm has been triggered.
- Yellow A WARNING level alarm has been triggered.
- Green **NO Alarm** has been triggered.
- Grey **No transmissions** have been received for this sensor.
- White This sensor is disabled from alarm processing.

orts Scre	en Size															
immary	Detail	Di	abled No	o Alarm	Warning	Critical	Unknown						Maximum A	lert Level		
Selected Se	nsor: 33753 Ro	oto Clone #1	(A) Motor OB	Brg. 1V												
32944 (6)	32945 (6)	32946 (6)	32947 (6)	32948 (6)	32949 (6)	32950 (6)	32951 (6)	32952 (6)	32953 (6)	32954 (6)	32955 (6)	32956 (6)	32957 (6)	32958 (6)	32959 (6)	
33000 (7)	33001 (7)	33002 (7)	33003 (7)	33004 (7)	33005 (7)	33006 (7)	33007 (7)	33096 (3)	33097 (3)	33098 (3)	33099 (3)	33100 (3)	33101 (3)	33102 (3)	33103 (3)	T
33104 (6)	33105 (6)	33106 (6)	33107 (6)	33108 (6)	33109 (6)	33110 (6)	33111 (6)	33120 (6)	33121 (6)	33122 (6)	33123 (6)	33124 (6)	33125 (6)	33126 (6)	33127 (6)	
**33248 (4	4) **33249 (4)	**33250 (4)	**33251 (4)	**33252 (4)	**33253 (4)	33254 (4)	**33255 (4)	**33256 (4)	**33257 (4)	33258 (4)	33259 (4)	**33260 (4)	**33261 (4)	**33262 (4)	**33263 (4)	
33264 (9)	33265 (9)	33266 (9)	33267 (9)	33268 (9)	33269 (9)	**33270 (9)	**33271 (9)	**33296 (6)	33297 (6)	33298 (6)	33299 (6)	33300 (6)	33301 (6)	33302 (6)	33303 (6)	
**33384 (4	4) **33385 (4)	33386 (4)	33387 (4)	**33388 (4)	33389 (4)	33390 (4)	33391 (4)	33408 (2)	33409 (2)	33410 (2)	33411 (2)	**33412 (2)	**33413 (2)	33414 (2)	33415 (2)	
33432 (10)) 33433 (10)	33434 (10)	33435 (10)	33436 (10)	33437 (10)	33438 (10)	33439 (10)	33472 (10)	33473 (10)	33474 (10)	33475 (10)	33476 (10)	33477 (10)	33478 (10)	33479 (10)	
33496 (6)	33497 (6)	33498 (6)	33499 (6)	33500 (6)	33501 (6)	33502 (6)	33503 (6)	**33512 (9)	**33513 (9)	**33514 (9)	33515 (9)	**33516 (9)	**33517 (9)	**33518 (9)	**33519 (9)	
33520 (6)	33521 (6)	33522 (6)	33523 (6)	33524 (6)	33525 (6)	33526 (6)	33527 (6)	33528 (7)	33529 (7)	33530 (7)	33531 (7)	33532 (7)	33533 (7)	33534 (7)	**33535 (7)	
33560 (6)	33561 (6)	33562 (6)	33563 (6)	33564 (6)	33565 (6)	33566 (6)	33567 (6)	33568 (3)	33569 (3)	33570 (3)	33571 (3)	33572 (3)	33573 (3)	33574 (3)	33575 (3)	
33600 (5)	33601 (5)	33602 (5)	33603 (5)	33604 (5)	33605 (5)	33606 (5)	33607 (5)	33608 (7)	**33609 (7)	**33610 (7)	**33611 (7)	**33612 (7)	**33613 (7)	33614 (7)	**33615 (7)	
33616 (6)	**33617 (6)	**33618 (6)	**33619 (6)	**33620 (6)	**33621 (6)	**33622 (6)	33623 (6)	33624 (6)	**33625 (6)	33626 (6)	33627 (6)	33628 (6)	33629 (6)	33630 (6)	33631 (6)	
33640 (6)	**33641 (6)	33642 (6)	**33643 (6)	33644 (6)	33645 (6)	33646 (6)	33647 (6)	33704 (10)	33705 (10)	33706 (10)	33707 (10)	33708 (10)	33709 (10)	33710 (10)	33711 (10)	
33736 (1)	**33737 (1)	33738 (1)	33739 (1)	33740 (1)	33741 (1)	33742 (1)	33743 (1)	33744 (7)	**33745 (7)	33746 (7)	33747 (7)	33748 (7)	33749 (7)	33750 (7)	33751 (7)	
**33752 (1	L) **33753 (1)	**33754 (1)	**33755 (1)	33756 (1)	33757 (1)	33758 (1)	33759 (1)	33768 (2)	33769 (2)	33770 (2)	33771 (2)	33772 (2)	33773 (2)	33774 (2)	33775 (2)	
33800 (11)) 33801 (11)	33802 (11)	33803 (11)	33804 (11)	33805 (11)	33806 (11)	33807 (11)	33808 (6)	33809 (6)	33810 (6)	33811 (6)	33812 (6)	33813 (6)	33814 (6)	33815 (6)	
33824 (3)	33825 (3)	33826 (3)	33827 (3)	33828 (3)	33829 (3)	33830 (3)	33831 (3)	**33832 (2)	**33833 (2)	**33834 (2)	**33835 (2)	33836 (2)	33837 (2)	33838 (2)	33839 (2)	
**33840 (1	L) **33841 (1)	**33842 (1)	**33843 (1)	**33844 (1)	33845 (1)	33846 (1)	33847 (1)	33920 (7)	33921 (7)	33922 (7)	33923 (7)	33924 (7)	33925 (7)	33926 (7)	33927 (7)	
33936 (3)	33937 (3)	33938 (3)	33939 (3)	33940 (3)	33941 (3)	33942 (3)	33943 (3)	33976 (6)	33977 (6)	33978 (6)	33979 (6)	33980 (6)	33981 (6)	33982 (6)	**33983 (6)	
**33984 (4	4) **33985 (4)	33986 (4)	33987 (4)	**33988 (4)	**33989 (4)	**33990 (4)	**33991 (4)	**34008 (9)	**34009 (9)	34010 (9)	**34011 (9)	34012 (9)	34013 (9)	**34014 (9)	34015 (9)	
34016 (5)	**34017 (5)	34018 (5)	34019 (5)	34020 (5)	34021 (5)	34022 (5)	34023 (5)	34040 (6)	34041 (6)	34042 (6)	34043 (6)	34044 (6)	34045 (6)	34046 (6)	34047 (6)	
34064 (2)	34065 (2)	34066 (2)	34067 (2)	**34068 (2)	**34069 (2)	**34070 (2)	**34071 (2)	**34072 (6)	34073 (6)	34074 (6)	34075 (6)	**34076 (6)	34077 (6)	34078 (6)	34079 (6)	
34080 (6)	34081 (6)	34082 (6)	34083 (6)	34084 (6)	34085 (6)	34086 (6)	34087 (6)	34160 (5)	34161 (5)	34162 (5)	34163 (5)	34164 (5)	34165 (5)	34166 (5)	34167 (5)	
34192 (7)	34193 (7)	34194 (7)	34195 (7)	34196 (7)	34197 (7)	34198 (7)	34199 (7)	34256 (11)	34257 (11)	34258 (11)	34259 (11)	34260 (11)	34261 (11)	34262 (11)	34263 (11)	
34368 (7)	34369 (7)	34370 (7)	34371 (7)	34372 (7)	34373 (7)	34374 (7)	34375 (7)	34424 (3)	34425 (3)	34426 (3)	34427 (3)	34428 (3)	34429 (3)	34430 (3)	34431 (3)	
34440 (3)	34441 (3)	34442 (3)	34443 (3)	34444 (3)	34445 (3)	34446 (3)	34447 (3)	**34448 (1)	**34449 (1)	**34450 (1)	**34451 (1)	34452 (1)	**34453 (1)		**34455 (1)	
34456 (4)	34457 (4)	34458 (4)	34459 (4)	34460 (4)	34461 (4)	**34462 (4)	34463 (4)	**34488 (4)	**34489 (4)	**34490 (4)	**34491 (4)	**34492 (4)	**34493 (4)	**34494 (4)	**34495 (4)	
**34512 (2		**34514 (2)		34516 (2)	34517 (2)	34518 (2)	34519 (2)	34520 (7)	34521 (7)	34522 (7)	34523 (7)	34524 (7)	34525 (7)	34526 (7)	34527 (7)	
34528 (4)	**34529 (4)	_	**34531 (4)		34533 (4)	**34534 (4)	**34535 (4)	**34536 (1)	**34537 (1)			34540 (1)	34541 (1)	34542 (1)	34543 (1)	Н
34576 (10)		34578 (10)	34579 (10)	34580 (10)	34581 (10)	34582 (10)	34583 (10)	34592 (1)	**34593 (1)	**34594 (1)		34596 (1)	34597 (1)	34598 (1)	34599 (1)	
34600 (2)	**34601 (2)	34602 (2)		34604 (2)	34605 (2)	34606 (2)	**34607 (2)	34608 (1)	34609 (1)		34611 (1)	**34612 (1)	**34613 (1)	**34614 (1)	**34615 (1)	
34632 (4)	34633 (4)	34634 (4)	34635 (4)	34636 (4)	34637 (4)	34638 (4)	34639 (4)	34656 (7)	**34657 (7)		**34659 (7)	**34660 (7)	**34661 (7)		**34663 (7)	
**34688 (2		**34690 (2)	**34691 (2)	**34692 (2)	**34693 (2)	34694 (2)	34695 (2)	34880 (1)	34881 (1)	**34882 (1)	**34883 (1)	34884 (1)	34885 (1)		34887 (1)	
**34888 (4		**34890 (4)	**34891 (4)	34892 (4)	34893 (4)	34894 (4)	34895 (4)	**34896 (4)	**34897 (4)	**34898 (4)	**34899 (4)	34900 (4)	34901 (4)	34902 (4)	34903 (4)	
34904 (7)	34905 (7)	34906 (7)	34907 (7)	34908 (7)	34909 (7)	34910 (7)	34911 (7)	34912 (6)	34913 (6)	34914 (6)	34915 (6)	34916 (6)	34917 (6)	34918 (6)	34919 (6)	
34920 (7)	34921 (7)	**34922 (7)	34923 (7)	**34924 (7)	34925 (7)	**34926 (7)		34928 (7)	34929 (7)	34930 (7)	34931 (7)	34932 (7)	34933 (7)	34934 (7)	34935 (7)	
34936 (7)	**34937 (7)	**34938 (7)	**34939 (7)	**34940 (7)	**34941 (7)	**34942 (7)	**34943 (7)	**34960 (1)	**34961 (1)	**34962 (1)	**34963 (1)	34964 (1)	34965 (1)	34966 (1)	**34967 (1)	
34976 (3) 35096 (6)	34977 (3)	34978 (3)	34979 (3)	34980 (3)	34981 (3)	34982 (3)	34983 (3)	35080 (11)	35081 (11)	35082 (11)	35083 (11)	35084 (11)	35085 (11)	35086 (11)	35087 (11)	Ŧ

Figure 121 – Echo[®] Alarm Status Screen – Summary Tab

Each cell in the summary table represents a single sensor. Clicking on a cell selects the indicated sensor for the options presented when the right mouse button is clicked (shown below). It will also turn the sensor's cell color to **blue** giving a clear indication of which sensor is selected. Additionally, the sensors other identifying information (machine & location) will show at the top of the table, the tip strip and in the Context Help window (ctrl-h) also shown below.

		D:	-blad Ni	Alarm	Maratas	Californi	Unimerum				
immary [)etail		abled No	o Alarm	Warning	Critical	Unknown				
Selected Sense	or: 33753 Ro	to Clone #1	(A) Motor OB	Brg. 1V							
33616 (6)	**33617 (6)	*133618 (6)	**33619 (6)	**33620 (6)	**33621 (6)	**33622 (6)	33623 (6)				
33640 (6)	**33641 (6)	33642 (6)	**33643 (6)	33644 (6)	33645 (6)	33646 (6)	33647 (6)	T			
33736 (1)	**33737 (7	33738 (1)	33739 (1)	33740 (1)	33741 (1)	33742 (1)	33743 (1)				
**33752 (1)	**33753 (1)	**33754 (1)	**:3755 (1)	33756 (1)	33757 (1)	33758 (1)	33759 (1)				
33800 (11)	33801 (11)	33 02 (11)	33803 (11)	33804 (11)	33805 (11)	33806 (11)	33807 (11)				
338 ³³⁷⁵³ R	oto Clone #1	one #1 (A) Motor OB Brg. 1N Context Hup									
**33840 (1)	**33841 (1)	**33842 (1)	Context Hop		1.00		1.000				
33936 (3)	33937 (3)	33938 (3)	Calacted Co	Deces 22752	Data Clana #		OP Pro 1V				
**33984 (4)	**33985 (4)	33986 (4)	Selected Se	11501: 55755	Roto Clone #		OB BIG. IV				
34016 (5)	**34017 (5)	34018 (5)	Left Click the mouse on a sensor (cell) to select it.								
34064 (2)	34065 (2)	34066 (2)	Right Click the mouse on the selected sensor to:								
34080 (6)	34081 (6)	34082 (6)	- View Data for the selected sensor								
34192 (7)	34193 (7)	34194 (7)	- View Alarms for the selected sensor								
34368 (7)	34369 (7)	34370 (7)			elected senso	r					
34440 (3)	34441 (3)	34442 (3)	- Clear Ala	rms for all se	nsors						

Figure 122 – Echo[®] Alarm Status Screen – Summary Tab with a Sensor Selected

ports Screen	Size									
Summary [Detail	Disa	abled	No Al	arm	Warning	Critical	Unknown		
Selected Sens	or: 33753 Ro	to Clone #1 (/	A) Motor	OB Brg	g. 1V					
33616 (6)	**33617 (6)	**33618 (6)	**33619 (6) **	33620 (6)	**33621 (6)	**33622 (6)	33623 (6)		
33640 (6)	**33641 (6)	33642 (6)	**33643 (6) 33	644 (6)	33645 (6)	33646 (6)	33647 (6)		
33736 (1)	**33737 (1)	33738 (1)	33739 (1)	33	3740 (1)	33741 (1)	33742 (1)	33743 (1)		
**33752 (1)	**33753 (1)	**22754 (1)		1) 3 3	3756 (1)	33757 (1)	33758 (1)	33759 (1)		
33800 (11)	33801 (11)	View Aları	ms	33	804 (11)	33805 (11)	33806 (11)	33807 (11		
33824 (3)	33825 (3)	View Data	ulo.		10000	100000-00	-			
**33840 (1)	**33841 (1)	<u> </u>	lp	-	1000	1000	1000			
33936 (3)	33937 (3)	Clear Alar	m	k the mouse on a sensor (cell) to select it.						
**33984 (4)	**33985 (4)	Clear All A	larme							
34016 (5)	**34017 (5)	cical All A								
34064 (2)	34065 (2)	34066 (2)	 - View Data for the selected sensor - View Alarms for the selected sensor - Clear Alarms for the selected sensor 							
34080 (6)	34081 (6)	34082 (6)								
34192 (7)	34193 (7)	34194 (7)								
34368 (7)	34369 (7)	34370 (7)								
34440 (3)	34441 (3)	34442 (3)	- Clear	Alarm	s for all se	nsors				
	Figure 123	– Echo® Alai	rm Status	Scree	en – Seleo	cted Sensor (Options			

Figure 123 – Echo® Alarm Status Screen – Selected Sensor Options

- View Alarms... brings up the screen (Figure 125)
- View Data... brings up the Trend Data screen (Figure 109)
- Clear Alarm will reset the selected sensors alarm
- Clear All Alarms clears all alarms

Echo® Monitoring Software User's Manual

At the top of the Echo[®] Alarm Status screen below is a Maximum Alert Level indicator. This will be the background color of the highest alert level currently being reported by a sensor assigned to the receiver. This indication is important in the event there are a large number of sensors in the system and they cannot all be viewed at once on the screen. If all cells in the display were green but this indication was red then it would alert the user to scroll through the table to find the sensor with the critical alarm. To maximize the Alarm screen select **Screen Size** | **Maximize** on the menu bar.

The Echo[®] Alarm Status screen also has a Detail tab shown below in Figure 124. This table provides detailed information about the sensor and the alarm. The columns it shows are as follows;

- Column 1 Sensor Id
- Column 2 The machine name and location where the sensor is located
- Column 3 Alarm Level, this shows the highest alarm level and an indication (**) if there is more than 1 alert present for the sensor.
- Column 4 Alarm time
- Columns 5-7 are sensor status fields for battery, RF and reporting frequency.

	creen Size	•													
ummary	y Detail		Disabled	No Alarm	Warning	Critical	Unkno	wn				Ma	ximum Alert Lev	el	
DI	lants I Δre:	as Machine Locat	ion					Sensor ID	Receiver	Reporting	Alarm Level	Alarm Time	Battery Status	RE Status	
		Blower OB Brg.					_	34046	6	Late	No Alarm	8/8/2016 2:21:04 PM	Excellent	Excellent	
		Blower OB Brg.						34047	6	Late	Cleared	8/8/2016 2:21:12 PM	Excellent	Excellent	
		#3 Munter Supply						5.0.0	·	Luce	cicarca	0,0,2020 202122 110	Encement	Excention	
		Motor OB Brg.						42952	6	Late	No Alarm	12/8/2016 7:30:26 AM	Excellent	Excellent	
		Motor OB Brg.						42953	6	Late	Critical**	12/8/2016 7:30:34 AM	Excellent	Excellent	
		Motor IB Brg. 2						42954	6	Late	Critical**	12/8/2016 7:30:41 AM	Excellent	Excellent	
		Motor IB Brg. 2						42955	6	Late	Critical**	12/8/2016 7:30:49 AM	Excellent	Excellent	
		Blower IB Brg. 3						42956	6	Late	No Alarm	12/8/2016 7:30:57 AM	Excellent	Excellent	
		Blower IB Brg. 3						42957	6	Late	No Alarm	12/8/2016 7:31:05 AM	Excellent	Excellent	
		Blower OB Brg.						10050	6	Late	Critical**	12/8/2016 7:31:12 AM	Excellent	Excellent	
		Blower OB Brg.					\	/iew Alarms.		Late	Critical**	12/8/2016 7:31:20 AM	Excellent	Excellent	
		#4 Munter Exhst V	AC FAN				\ \	/iew Data	N						
		Motor OB Brg.							-6-	Late	No Alarm	12/8/2016 8:50:31 AM	Excellent	Excellent	
		Motor OB Brg.					(Clear Alarm		Late	Critical**	12/8/2016 8:50:39 AM	Excellent	Excellent	
		Motor IB Brg. 2	Н					Open All Iten	25	Late	Warning	12/8/2016 8:50:47 AM	Excellent	Excellent	
		Motor IB Brg. 2	v							Late	Warning**	12/8/2016 8:50:54 AM	Excellent	Excellent	
		Blower IB Brg. 3	н				(Close All Iten	ns	Late	No Alarm	12/8/2016 8:51:02 AM	Excellent	Excellent	
		Blower IB Brg. 3	V					33645	6	Late	No Alarm	12/8/2016 8:51:10 AM	Excellent	Excellent	
		- Blower OB Brg.	4H					33646	6	Late	No Alarm	12/8/2016 8:51:18 AM	Excellent	Excellent	
		Blower OB Brg.	4V					33647	6	Late	No Alarm	12/8/2016 8:51:25 AM	Excellent	Excellent	
		#4 Munter Supply	FAN												
		Motor OB Brg.	1H					35096	6	Late	No Alarm	12/8/2016 2:37:58 AM	Excellent	Excellent	
		Motor OB Brg. 1	IV					35097	6	Late	No Alarm	12/8/2016 2:38:06 AM	Excellent	Excellent	
		- Motor IB Brg. 2	н					35098	6	Late	No Alarm	12/8/2016 2:38:13 AM	Excellent	Excellent	
		Motor IB Brg. 2	V					35099	6	Late	Warning**	12/8/2016 2:38:21 AM	Excellent	Excellent	
		Blower IB Brg. 3	H					35100	6	Late	Warning	12/8/2016 2:38:29 AM	Excellent	Excellent	
		Blower IB Brg. 3	V					35101	6	Late	Warning**	12/8/2016 2:38:36 AM	Excellent	Excellent	
	-	Blower OB Brg.	4H					35102	6	Late	Critical	12/8/2016 2:38:44 AM	Excellent	Excellent	
		Blower OB Brg.	4V					35103	6	Late	No Alarm	12/8/2016 2:38:52 AM	Excellent	Excellent	
		#5 Munter Exhst V	AC FAN												
	-	Motor OB Brg.1	1H					34072	6	Late	Critical**	12/8/2016 1:28:29 AM	Excellent	Excellent	
	-	Motor OB Brg.	1V					34073	6	Late	No Alarm	12/8/2016 1:28:36 AM	Excellent	Excellent	
		- Motor IB Brg. 2	н					34074	6	Late	Cleared	12/8/2016 1:28:44 AM	Excellent	Excellent	
		Motor IB Brg. 2						34075	6	Late	No Alarm	12/8/2016 1:28:52 AM	Excellent	Excellent	
		Blower IB Brg. 3	H					34076	6	Late	Critical**	12/8/2016 1:28:59 AM	Excellent	Excellent	
		Blower IB Brg. 3	V					34077	6	Late	No Alarm	12/8/2016 1:29:07 AM	Excellent	Excellent	
		Blower OB Brg.	4H					34078	6	Late	No Alarm	12/8/2016 1:29:15 AM	Excellent	Excellent	
		Blower OB Brg.	4V					34079	6	Late	No Alarm	12/8/2016 1:29:23 AM	Excellent	Excellent	

Figure 124 – Echo® Alarm Status Screen – Detail Tab

Right clicking the mouse on a sensor row in Figure 124 will bring up the short-cut menu.

- View Alarms... brings up the screen (Figure 125)
- View Data... brings up the Trend Data screen (Figure 109)
- Clear Alarm will reset the selected sensors alarm and show the alarm level in column 3 as 'cleared'

4.2.15.1.1 Channel Alarm Dialog Screen

The Channel Alarm Dialog screen is accessed from several locations including rightclicking on the System Alarm Status Screen (either tab) or by right-clicking the main screen sensor tree and selecting View Alarms... It provides detailed information regarding the alarms being reported for a sensor. It indicates;

- What data reading(s) triggered the alarm
- The current alarm level set for the data type
- The actual reading that triggered it
- The time it occurred

Current Alarms for 3283	37 CP3 R1 A Ex Pump 2	2241 1-6 DE Motor	Receiver 2
	Alarm Setting	32837 CP3 R1 A Ex Pump 2	Time
Velocity (ips rms) Warning	0.500		
Velocity (ips rms) Critical	0.750		
Velocity (ips pk) Warning	1.000		
Velocity (ips pk) Critical	1.250		
Acceleration (g rms) Warning	3.000	3.36	5/11/2015 12:23:09 AM
Acceleration (g rms) Critical	4.500		
Acceleration (g pk) Warning	4.300	4.75171 View Data.	5/11/2015 12:23:09 AN
Acceleration (g pk) Critical	6.400	Cancel ⁴	
Acceleration (g true pk) Warning	16.000	18.27	5/11/2015 12:23:09 AM
Acceleration (g true pk) Critical	20.000		
Crest Factor Warning	6.000		
Crest Factor Critical	9.000		

Figure 125 – Echo[®] Channel Alarm Dialog

The **Refresh** button will update the displayed data

The **OK** button will close the screen and return to the calling window.

Right Click on a selected data types alarm to close this window and view its data in greater detail.

From the menu bar (Figure 126) you can:

- **Clear** the selected alarm (click on a row in the table to select one)
- **Change Alarm Level...** This brings up the Change Alarm Level Dialog (Figure 114)
- **Print** This will print a report of the displayed alarms.

🧏 Echo	Channel Alarm Dialog
Alarms	
Clear	
Chan	ge Alarm Level 854
Print	
_	15 N

Figure 126 – Echo[®] Channel Alarm Dialog Menu Bar Items

4.2.15.1.2 Alarm Status Screen Reports

The Alarm Status screen menu bar has a report option (Figure 127). Clicking it reveals two report selections; **Last Measurements** and **Alarms**. Selecting Last Measurements will display a Last Measurements preview screen shown in Figure 128 where the operator can choose to print a report of the last measurement for each sensor assigned to the receiver.

Similarly, selecting the Alarm option presents an Alarm preview screen from which a report can be printed showing the alarm status of each sensor.

Alarm Status for: PCB Echo	1 PCB Echo
Reports	
Last Measurements	
Alarms	Disabled

Figure 127 – Echo[®] Alarm Status Screen Menu Bar

Echo® Monitoring Software User's Manual

ast Measurements								
Sensor Id	Transmission Time	RMS Velocity (ips)	Peak Velocity (ips)	RMS Accel (g)	Peak Accel (g)	True Peak Accel (g)	Crest Factor	
126 CSS 13 Cryst Recirc Fan Motor	1/8/2013 10:00:53 PM	0.894	1.264295	0.81	1.145502	4.606875	5.6875	1
127 CSS 13 Cryst Recirc Fan Motor	1/8/2013 10:07:51 PM	0.727	1.028123	0.575	0.8131649	2.73125	4.75	
131 TPA N2 Compressor 1411 DE	6/28/2012 10:45:12 AM	0.004	0.0056568	0	0	0	0	1
132 TPA N2 Compressor 1411 ND	3/27/2012 1:08:07 PM	0.005	0.007071	0.52	0.7353839	0.78	1.5	
32792 PCB-CA Jbox 123-MT	3/27/2015 5:25:13 PM	0.002	0.0028284	0.005	0.007071	0	0	1
32793 PCB-CA Jbox 123-MT	3/27/2015 5:25:21 PM	0.002	0.0028284	0.005	0.007071	0	0	1
32794 PCB-CA Jbox 123-MT	3/27/2015 5:25:29 PM	0.002	0.0028284	0.005	0.007071	0	0	1
32795 PCB-CA Jbox 123-MT	3/27/2015 5:25:37 PM	0.002	0.0028284	0.005	0.007071	0	0	1
32796 PCB-CA Jbox 123-MT	3/27/2015 5:25:44 PM	0.002	0.0028284	0.005	0.007071	0	0	1
32797 PCB-CA Jbox 123-MT	3/27/2015 5:25:52 PM	0.003	0.0042426	0.005	0.007071	0	0	1
32798 PCB-CA Jbox 123-MT	3/27/2015 5:26:00 PM	0.002	0.0028284	0.005	0.007071	0	0	1
32799 PCB-CA Jbox 123-MT	3/27/2015 5:21:08 PM	0.002	0.0028284	0.005	0.007071	0	0	1
32896 CSS9 N2 Fan 4030 8-1 NDE N	1/9/2013 9:52:05 AM	0.066	9.333719E-02	0.18	0.254556	0.77625	4.3125	1
32897 CSS9 N2 Fan 4030 8-2 DE Mc	1/9/2013 9:52:13 AM	0.073	0.1032366	0.625	0.883875	2.890625	4.625	1
32898 CSS9 N2 Fan 4030 8-3 DE Far	1/9/2013 9:52:21 AM	0.052	0.0735384	0.685	0.968727	3.382188	4.9375	1
32899 CSS9 N2 Fan 4030 8-4 NDE F	1/9/2013 9:52:29 AM	0.057	0.0806094	0.725	1.025295	3.625	5	1
32900 CSS9 N2 Fan 4040 8-5 NDE N	1/9/2013 9:52:36 AM	0.135	0.190917	1.685	2.382927	9.2675	5.5	1
32901 CSS9 N2 Fan 4040 8-6 DE Mc	1/9/2013 9:52:44 AM	0.058	0.0820236	1.365	1.930383	6.825	5	1
32902 CSS9 N2 Fan 4040 8-7 DE Far	1/9/2013 1:52:44 AM	0.116	0.1640472	0.57	0.8060939	2.600625	4.5625	1
32903 CSS9 N2 Fan 4040 8-8 NDE F	1/9/2013 9:53:00 AM	0.136	0.1923312	1.19	1.682898	5.578125	4.6875	
32904 CP2 Main Hot Oil Pump 1600	1/9/2013 8:34:55 AM	0.007	0.0098994	0	0	0	0	1
32905 CP2 Main Hot Oil Pump 1600	1/9/2013 8:35:03 AM	0.007	0.0098994	0	0	0	0	1
32906 CP2 Main Hot Oil Pump 1600	1/9/2013 8:35:11 AM	0.009	0.0127278	0.015	0.021213	0	0	
32907 CP2 Main Hot Oil Pump 1600	1/9/2013 8:35:18 AM	0.006	0.0084852	0.055	0.077781	0.268125	4.875	
32908 CP2 Main Hot Oil Pump 1601	1/9/2013 8:35:26 AM	0.046	6.505319E-02	0.11	0.155562	0.474375	4.3125	
32909 CP2 Main Hot Oil Pump 1601	1/9/2013 8:35:34 AM	0.1	0.14142	0.095	0.134349	0.5521875	5.8125	
32910 CP2 Main Hot Oil Pump 1601	1/9/2013 8:35:41 AM	0.158	0.2234436	0.535	0.756597	2.474375	4.625	
32911 CP2 Main Hot Oil Pump 1601	1/9/2013 8:35:49 AM	0.081	0.1145502	0.31	0.438402	1.43375	4.625	
91 CSS 13 Cryst Recirc Fan OB	1/9/2013 5:52:05 AM	0.157	0.2220294	1.71	2.418282	11.75625	6.875	
97 CSS 13 Cryst Recirc Fan IB	1/9/2013 5:46:35 AM	0.111	0.1569762	1.65	2.33343	8.45625	5.125	
100 CSS 12 Cryst Recirc Fan OB	1/8/2013 9:28:24 PM	0.082	0.1159644	3.29	4.652718	17.06688	5.1875	٦

Figure 128 – Echo® Last Measurement Report Preview Screen

4.2.15.2 System Sensor Status Screen

A system level view of sensor status can be found by selecting System View | Sensor Status from the main screen menu bar. This screen is identical to the receiver sensor status screen in content but it shows all sensors assigned all receivers for the selected database. Additionally the data can be arranged vertically in a single column like the single receiver screen or horizontally as shown below in a 3 column view. The screen layout menu bar option facilitates this selection.

ort Item Screen Layout											
Warning: Replace batteries with 1 diamond in	nmediately										
Receiver - Sensor	Battery	RF Power	Data	Receiver - Sensor	Battery	RF Power	Data	Receiver - Sensor	Battery	RF Power	Dat
2-32848 CP4 R1 Ex Pump 2240 3-1 NDE Motor	•	****	•	1-126 CSS 13 Cryst Recirc Fan Motor DE	****	***	•	1-127 CSS 13 Cryst Recirc Fan Motor NDE	****	****	Ð
1-132 TPA N2 Compressor 1411 ND	****	*	ΘX	1-32904 CP2 Main Hot Oil Pump 1600 9-1 NDE I	****	****	•	1-32905 CP2 Main Hot Oil Pump 1600 9-2 DE M	****	****	ΘĐ
1-32907 CP2 Main Hot Oil Pump 1600 9-4 NDE I	****	****	OX	1-32908 CP2 Main Hot Oil Pump 1601 9-5 NDE I	****	****	•	1-32909 CP2 Main Hot Oil Pump 1601 9-6 DE M	****	****	08
1-32911 CP2 Main Hot Oil Pump 1601 9-8 NDE I	****	****	0 X	1-32896 CSS9 N2 Fan 4030 8-1 NDE Motor	****	****	• 🛛	1-32897 CSS9 N2 Fan 4030 8-2 DE Motor	****	****	0
1-32899 CSS9 N2 Fan 4030 8-4 NDE Fan	****	****	e 🛛	1-32900 CSS9 N2 Fan 4040 8-5 NDE Motor	****	****	•	1-32901 CSS9 N2 Fan 4040 8-6 DE Motor	****	****	© B
1-32903 CSS9 N2 Fan 4040 8-8 NDE Fan	****	****	e 🗷	1-32792 PCB-CA Jbox 123-MT	****	****	®₫	1-32793 PCB-CA Jbox 123-MT	****	****	œ۷
1-32795 PCB-CA Jbox 123-MT	****	****	ΘØ	1-32796 PCB-CA Jbox 123-MT	****	****	œ⊠	1-32797 PCB-CA Jbox 123-MT	****	****	œ۲
1-32799 PCB-CA Jbox 123-MT	****	****	ΘØ	2-91 CSS 13 Cryst Recirc Fan OB	****	****	•	2-97 CSS 13 Cryst Recirc Fan IB	****	****	0
2-101 CSS 12 Cryst Recirc Fan IB	****	****	0 X	2-111 D&E Transfer Blower DE	****	****	•	2-125 D&E Transfer Blower ND	****	****	0
2-32833 CP3 R1 A Ex Pump 2240 1-2 DE Motor	****	****	0 X	2-32834 CP3 R1 A Ex Pump 2240 1-3 DE Pump	****	***	•	2-32835 CP3 R1 A Ex Pump 2240 1-4 NDE Pum	****	****	0
2-32837 CP3 R1 B Ex Pump 2241 1-6 DE Motor	****	****	e 🛛	2-32838 CP3 R1 B Ex Pump 2241 1-7 DE Pump	****	****	•	2-32839 CP3 R1 B Ex Pump 2241 1-8 ND Pump	****	****	ΘÞ
2-32865 CP4 Main Hot Oil Pump 1600 5-2 DE M		****	08	2-32866 CP4 Main Hot Oil Pump 1600 5-3 DE Pu			8	2-32867 CP4 Main Hot Oil Pump 1600 5-4 NDE I		****	ΘÞ

Figure 129 – Echo® System View – Sensor Status Screen

4.2.15.3 Echo[®] System Overview Screen

The Echo[®] System Overview screen is accessed by selecting System View | Echo System Overview... from the main screen menu bar. This screen is intended for a large display monitor placed in a common area. It has large print and icons making it viewable from a distance. Its purpose is to convey both sensor and machine status at a glance. Each text entry contains the machine name, location and sensor ID. The background color indicates if the machine is operating within established limits (green), in a warning alarm state (yellow) or in a critical alarm state (red).

In addition to the text there are icons for battery status, RF status and Reporting status to indicate whether the sensor is reporting readings on time or is late.

Figure 130 displays a partial shot of this large screen with the available sorting options expanded. The screen is formatted to show 70 measurement points on a single page. If more than 70 points are in the system then the display will page the display every 30 seconds so all points can be seen. The measurement points can be sorted by the various status items to suit the user's preference or the window can be set to cycle through all status items, one at a time, to see the system status from different perspectives. Last Measurement and Alarm reports can also be printed from this screen by selecting the Report menu bar item. The screen is refreshed with data from the database every 5 minutes. The default sort selection is 'Smart Sort'. This organizes the data in an order that lists the most severe problems first. The priority assigned to potential problems is as follows:

- 1 Machine critical Alarms
- 2 Machine warning alarms
- 3 Transmissions Missed
- 4 Battery = 0 (dead)
- 5 Battery = 1 (poor)
- 6 Battery = 2 (ok but consider ordering a new one)
- 7 RF=0
- 8 RF=1
- 9 The rest

🧏 Echo System Overview for: PCB Echo 1

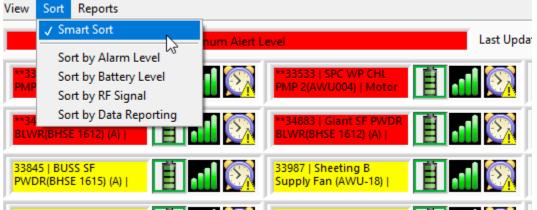


Figure 130 – Echo[®] System View – Echo[®] System Overview Screen

In the top right of the screen (Figure 131) is an indication of when the data was last refreshed from the database, how the data is sorted and the number of pages the will be displayed.

	100	
Last Update:	Tuesday, April 23, 2013 10	0:23 AM Sorted by : Alarms Page 1 of 2
32855 CP4 R1 Ex P 2241 3-8 NDE Pur		**32869 CP4 Main Hot Oil Pump 1601 5-6 DE
132 TPA N2 Comp 1411 ND (1)	ressor	32792 PCB-CA Jbox (1)

Figure 131 – Echo[®] System View – Echo[®] System Overview Screen information

4.2.15.3.1 Customizing the System Overview Channel Selection.

The System Overview screen can be customized to show only the channel groups of interest. Select View | Channel Selection.

🏂 Echo System Overview for: PCB Echo 1							
View	Sort	Reports					
All	Chann						
Ch	Channel Selection						
			2				

This will display the following screen where channels with specific Plant and Group Ids can be selected.

х

Group Id's Plant Id's Any... Any... ٨ ٨ Dust Collection Bamboo Dust Collect PCB Eclipse Dust Collect GBO 3rd Floor AWU GBO Factory AHU GBO 4th FI Dust Collect **GBO** Packaging Eclipse Gum Recovery Maintenance Shop / Stockroom Munters Office Area Penthouse Processing AHU Processing Dust Collect Roof AHU West Coast Wrapping AHU Wrapping Dust Collect Select Cancel

A confirmation screen will appear after the **Select** button is clicked indicating wow many sensors are in the selected group(s).

2	×
2 Sensor	s Found
Exit	New Selection

🧟 Custom System Overview Selection Dialog

Selecting Exit implements the new overview screen selections.

🎘 Echo System Overview for: PCB Echo 1			
View Sort Reports			
Maximum Alert Level	Last Update: Monday, October 21, 2019 3:34 Pl	A Sorted by : Smart Sort	Page 1 of 1 ** Custom List **
242 Desk 2nd floor v3.07 916 MHz (1)	Not Installed	Not Installed	11 🕥

Figure 132 – Echo® System View – Echo® System Overview Custom Channel Selection

To reset the overview screen to all channels select View | All Channels.

4.2.16 Database Merge Utility

If an installation of the Echo[®] hardware includes the portable receiver and computer component then it will be necessary to use the database merge utility to transfer data collected with the portable unit to a main database which will likely reside on a server. To access the Merge Databases Utility select; Tools | Merge Databases Utility... from the main screen menu bar.

Echo® Monitoring Software User's Manual

Echo® Data Presentation Software								
Configuration	Display	Receiver Utili	ties	System View	Tools	Administration	Help	
Sensors	defined	in the select	Me	rge Databases Utili	ity			
Receiver	Group S	Sensor ID	chine & Locati	1 F 10 F 1				
	32846				Tra	Transmission Reliability		
	32847			3 R1B Polymer	I	Hansmission Kenability		
32856			CP	3 R1B Ex Pump	Ala	Alarm Generation Utility		
	32857		CP	3 R1B Ex Pump	224014	-Z DE INIOLOI		
	Figure	133 – Echo [®]]	Maiı	1 Screen – To	ols menu	1 option		

This action will bring up the screen in Figure 134. To run the utility enter the connection (UDL or DSN) file for the main database in the 1st connection field and then the connection file for the remote (portable) database and then click the 'Merge Database' button.

rar	s utility is used to transfer Echo® Sensor configuration and asmission records from a remote mobile Echo® data collection tem to the main database of a primary system running on a server.
1) E 2) E	ructions: Inter the ODBC UDL or DSN file used to connect to the Main database Inter the ODBC UDL or DSN file used to connect to the Remote database Click on the 'Merge Databases' button.
	Main Connection R C:\PCB\Echo\Database\EchoDataSQL.udl
	Remote Connection
	ရူ C:\PCB\Echo\Database\EchoSQL2008.dsn
	Merge Databases

Figure 134 – Echo[®] Database Merge Utility

This process involves the following steps;

4.2.16.1 Compare Sensor Definitions

The sensor definitions in main and remote databases are compared. If a new or updated sensor is found in the remote database then the operator is prompted (Figure 135) to see if

they want to update the Main database with this new data from the remote database. This dialog will appear for every sensor definition where a difference is found.

As X
Remote Sensor 32792 has the following definition differences from the entry in the main database: -Transmission Interval -CF Report Level -TX Band Setting
Do you want to update the main database?
Yes No

Figure 135 – Echo[®] Database Merge Utility – Sensor definition mismatch dialog

4.2.16.2 New Transmission Update

Next the utility checks to see if there are transmissions in the remote database that are not in the Master database. If so it lists them in a table (Figure 136) where the user can select which ones they want added to the main database. Check the 'Disable Emails During Import' box to inhibit alarm emails from being sent as part of the merge process.

Sensor Name	Receiver	Date & Time	RMS Velocity	Peak Velocity	RMS Acceleration	Peak Acceleration	True Peak Acceleration	Crest Factor	Battery Status	RF Status
32792 PCB-CA Jbox	1	12/19/2012 10:35:50 AM	0.008	0.0113136	0.005	0.007071	0	0	D	3
32792 PCB-CA Jbox	1	1/3/2013 4:21:17 PM	0.009	0.0127278	0.005	0.007071	0	0	D	3
32792 PCB-CA Jbox	1	1/3/2013 4:29:37 PM	0.006	0.0084852	0.005	0.007071	0	0	3	3
32792 PCB-CA Jbox	1	1/3/2013 5:11:19 PM	0.007	0.0098994	0.005	0.007071	0	0	D	3
32792 PCB-CA Jbox	1	1/4/2013 11:38:01 AM	0.007	0.0098994	0.005	0.007071	0	0	2	3
32792 PCB-CA Jbox	1	1/4/2013 1:38:02 PM	0.007	0.0098994	0.005	0.007071	0	0	3	3
32792 PCB-CA Jbox	1	1/4/2013 3:38:08 PM	0.006	0.0084852	0.005	0.007071	0	0	3	3
32792 PCB-CA Jbox	1	1/9/2013 2:59:02 PM	0.008	0.0113136	0.005	0.007071	0	0	D	3
32792 PCB-CA Jbox	1	1/9/2013 3:33:04 PM	0.006	0.0084852	0.005	0.007071	0	0	3	3
32792 PCB-CA Jbox	1	1/9/2013 3:44:02 PM	0.005	0.007071	0.005	0.007071	0	0	3	3
32792 PCB-CA Jbox	1	1/9/2013 3:48:57 PM	0.005	0.007071	0.005	0.007071	0	0	3	3
32792 PCB-CA Jbox	1	1/9/2013 4:27:49 PM	0.006	0.0084852	0.005	0.007071	0	0	3	3
32792 PCB-CA Jbox	1	1/9/2013 4:34:28 PM	0.006	0.0084852	0.005	0.007071	0	0	D	3
32792 PCB-CA Jbox	1	1/9/2013 4:53:04 PM	0.006	0.0084852	0.005	0.007071	0	0	3	3
32792 PCB-CA Jbox	1	1/9/2013 5:00:59 PM	0.005	0.007071	0.005	0.007071	0	0	D	3
32792 PCB-CA Jbox	1	1/10/2013 8:58:38 AM	0.007	0.0098994	0.005	0.007071	0	0	D	3
32792 PCB-CA Jbox	1	1/10/2013 10:58:40 AM	0.006	0.0084852	0.005	0.007071	0	0	3	3
32792 PCB-CA Jbox	1	1/10/2013 12:58:45 PM	0.006	0.0084852	0.005	0.007071	0	0	3	3
32792 PCB-CA Jbox	1	1/10/2013 2:58:51 PM	0.006	0.0084852	0.005	0.007071	0	0	3	3
32793 PCB-CA Jbox	1	12/19/2012 10:35:57 AM	0.005	0.007071	0.005	0.007071	0	0	3	3
32793 PCB-CA Jbox	1	1/3/2013 4:21:24 PM	0.005	0.007071	0.005	0.007071	0	0	3	3
32793 PCB-CA Jbox	1	1/3/2013 4:29:45 PM	0.004	0.0056568	0.005	0.007071	0	0	3	з
32793 PCB-CA Jbox	1	1/3/2013 5:11:27 PM	0.004	0.0056568	0.005	0.007071	0	0	3	3
32793 PCB-CA Jbox	1	1/4/2013 11:38:08 AM	0.004	0.0056568	0.005	0.007071	0	0	3	3
32793 PCB-CA Jbox	1	1/4/2013 1:38:10 PM	0.004	0.0056568	0.005	0.007071	0	0	3	3

Figure 136 – Echo® Database Merge Utility – Transmission Update Dialog Selecting 'OK' will copy the selected transmissions from the remote database to the main database. A confirmation of the transfer will appear when it is complete.

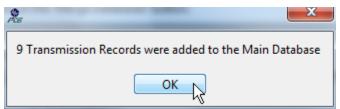


Figure 137 – Echo[®] Database Merge Utility – Confirmation Dialog

5 Microsoft SQL Server 2008 R2 Express Installation

The Echo[®] Monitoring Software requires the installation of Microsoft SQL Server to store and retrieve sensor data. This section is provided as an example of an SQL Server Express installation. If you already have SQL Server installed then you can skip this section and attach the Echo[®] database to the installed version. Depending on the environment this software is being installed into the user may want to override some of the default installation options. Following are screen shots of a successful installation of SQL Express 2008 R2. Echo[®] Monitoring Software also works with newer versions of SQL Server (e.g. SQL Server 2012 etc.)

This section is not intended to be a tutorial on SQL. If your company already has an SQL database engine running on a server you can simply attach the Echo[®] database and point the Echo[®] software to it. If you do decide to install the Express version then these screen shots are meant to show an example of a successful install. The specific settings regarding user authorization will be site specific. To install SQL Express 2008 R2 run the **SQLEXPR_x64_ENU.exe** application and follow these steps.

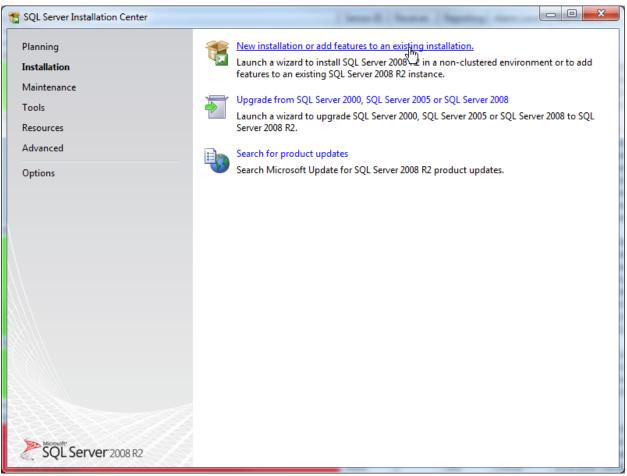


Figure 138 Microsoft SQL 2008 Initial Installation Screen

If you do not already have SQL installed on the computer select the New Installation option.

🚡 SQL Server 2008 R2 Setup	Constant a location of the	
Setup Support Rules		
Setup Support Rules identify pro corrected before Setup can contin	olems that might occur when you install SQL Server Setup support files. F iue.	ailures must be
Setup Support Rules	Operation completed. Passed: 10. Failed 0. Warning 1. Skipped 0.	
Feature Selection		
Installation Rules		
Instance Configuration	Hide details <<	Re-run
Disk Space Requirements	View detailed report	
Server Configuration	Ru Rule	Status
Database Engine Configuration	Suite State	Passed
Error Reporting Installation Configuration Rules		
Installation Progress	Unsupported SQL Server products	Passed
Complete	Performance counter registry hive consistency	Passed
Complete	Previous releases of SQL Server 2008 Business Intelligence Devel	
	Previous CTP installation	Passed E
	Consistency validation for SQL Server registry keys	Passed
	Computer domain controller	Passed
	Microsoft .NET Application Security	Passed
	Edition WOW64 platform	Passed
	Windows PowerShell	Passed
	🛕 Windows Firewall	Warning 👻
	< Back Next >	Cancel Help

Figure 139 Microsoft SQL Server Setup Support Rules.

• You may or may not see this screen initially. If there are compatibility problems with other components installed on the target PC then you likely will. Click on the status of the offending item to see how to resolve it.

Installation Type Specify whether you want to p	erform a new installation or	r add features to an ex	isting instance of SQ	L Server.			
Setup Support Rules Installation Type License Terms Feature Selection Installation Rules Instance Configuration Disk Space Requirements Server Configuration Database Engine Configuration Error Reporting	Select this option components such Add features to an SQLEXPRESS Select this option you want to add t	Select this option if you want to add features to an existing instance of SQL Server. For example, you want to add the Analysis Services features to the instance that contains the Database Engine. Features within an instance must be the same edition.					
Installation Configuration Rules	Instance Name	Instance ID	Features	Edition	Version		
Installation Progress	SQLEXPRESS	MSSQL10_50.SQLE	SQLEngine, SQLEn	Express	10.52.4042.0		
Complete	<shared compon<="" td=""><td></td><td>SSMS</td><td></td><td>10.52.4042.0</td></shared>		SSMS		10.52.4042.0		

Figure 140 Microsoft SQL Server Component Installation Type

• Select New Installation and then Next.

Echo® Monitoring Software User's Manual

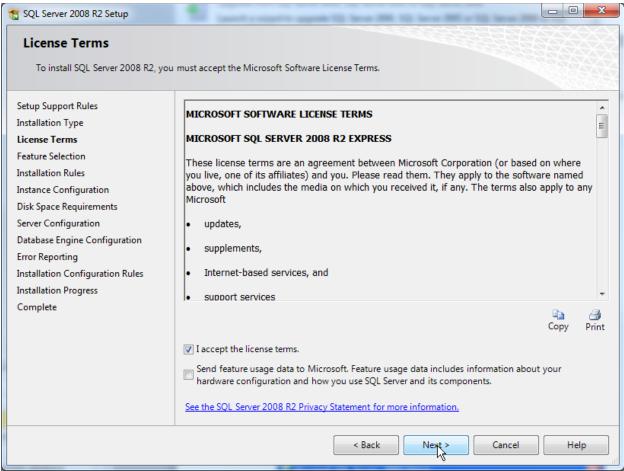


Figure 141 Microsoft Component Installer License Terms

• Click Accept and Next

1 SQL Server 2008 R2 Setup	COLUMN & Description of the		
Feature Selection Select the Express features to insta	п.		
Setup Support Rules Feature Selection Installation Rules Instance Configuration Disk Space Requirements Server Configuration Database Engine Configuration Error Reporting Installation Configuration Rules Installation Progress Complete	Features: Instance Features Database Engine Services Solution Schared Features Superior State Connectivity State Redistributable Features		Description: Server features are instance-aware and have their own registry hives. They support multiple instances on a computer.
	Select All Unselect All Shared feature directory: Shared feature directory (x86):	c:\Program Files\Microsoft SQ c:\Program Files (x86)\Microsoft	
	1	< Back Next	Cancel Help

Figure 142 Microsoft SQL Server Installer Feature Selection Dialog

• Click the Select All button and then Next

SQL Server 2008 R2 Setup Instance Configuration Specify the name and instance I		erver. Instance II) becomes part of th	e installation path.				
Setup Support Rules Feature Selection Installation Rules	 Default instance Named instance: 	SQLEXPRESS						
Instance Configuration Disk Space Requirements Server Configuration Database Engine Configuration Error Reporting	Instance ID: Instance root directory	SQLEXPRESS r: C:\Program F	iles\Microsoft SQL S	erver\				
Installation Configuration Rules Installation Progress Complete	SQL Server directory: C:\Program Files\Microsoft SQL Server\MSSQL10_50.SQLEXPRESS Installed instances:							
	Instance Name	Instance ID	Features	Edition	Version			
			< Back	Next Can	cel Help			

Figure 143 Microsoft SQL Server Installer Instance Configuration

• Select Named instance 'SQLEXPRESS' and then Next.

😭 SQL Server 2008 R2 Setup	Constant & Description &		_	- 0 ×
Server Configuration Specify the service accounts and	collation configuration.			
Setup Support Rules Feature Selection Installation Rules Instance Configuration	Service Accounts Collation Microsoft recommends that you Service	use a separate account for ea	ach SQL Server s Password	ervice. Startup Type
Disk Space Requirements Server Configuration Database Engine Configuration Error Reporting Installation Configuration Rules Installation Progress Complete	SQL Server Database Engine SQL Server Browser	TY_NETWORK SERVICE NT AUTHORITY/NETWO NT AUTHORITY/SYSTEM < <browse>> Use the sam</browse>	R hj	Automatic Disabled SQL Server services
		< Back Next	> Cane	cel Help

Figure 144 Microsoft SQL Server Configuration Dialog

- Click on the Account Name item of the SQL Server Database Engine row and select the System option. This is appropriate option for a standalone setup. If the SQL Server is located on a remote server consult your IT department or database administrator for the appropriate setting.
- Click Next.

Specify Database Engine authen Setup Support Rules Feature Selection	Account Provisioning Data Directories User Instances	week of the second
Feature Selection Installation Rules Instance Configuration Disk Space Requirements Server Configuration Database Engine Configuration Error Reporting Installation Configuration Rules Installation Progress Complete	Specify the authentication mode and administrators for t Authentication Mode Windows authentication mode Mixed Mode (SQL Server authentication and Windows Specify the password for the SQL Server system administr Enter password: Confirm password: Specify SQL Server administrators	authentication)
	Add Current User Add Remove	SQL Server administrators have unrestricted access to the Database Engine.

Figure 145 Microsoft SQL Server Feature Selection Dialog

- Select Windows Authentication Mode
- Add the users you want to be administrators for the database. These users will be allowed access to the database engine via the SQL Management Studio tool to 'Attach' the Echo[®] database and do database maintenance.
- Click Next

Echo® Monitoring Software User's Manual

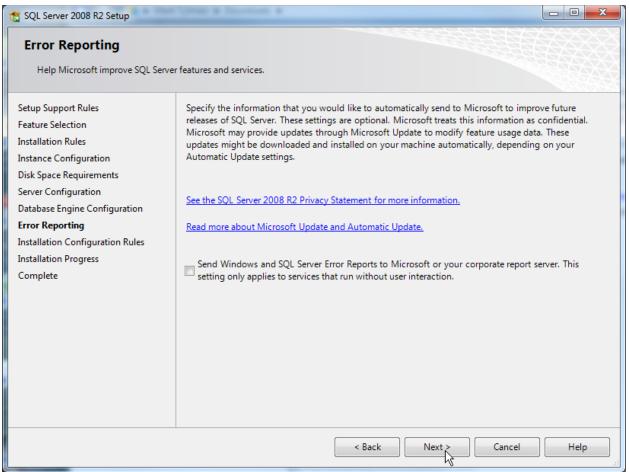


Figure 146 Microsoft SQL Server Authentication Mode Selection Dialog

• Click Next the SQL database server will now be installed

1 SQL Server 2008 R2 Setup	
Complete Your SQL Server 2008 R2 installa	ation completed successfully.
Setup Support Rules Feature Selection Installation Rules Instance Configuration Disk Space Requirements Server Configuration Database Engine Configuration Error Reporting Installation Configuration Rules Installation Progress Complete	Summary log file has been saved to the following location: <u>C:\Program Files\Microsoft SQL Server\100\Setup Bootstrap\Log\20151028 135753</u> <u>\Summary CAS012N 20151028 135753.txt</u> Information about the Setup operation or possible next steps: Vour SQL Server 2008 R2 installation completed successfully.
	Supplemental Information: The following notes apply to this release of SQL Server only. Microsoft Update For information about how to use Microsoft Update to identify updates for SQL Server 2008 R2, see the Microsoft Update Web site at http://go.microsoft.com/fwlink/?LinkId=108409 . Samples
	Close Help

Figure 147 Microsoft SQL Server Successfully installed Dialog

- Click Close
- Then close the SQL Server Installation Center window
- Now install the SQL Server Management Studio application by running the **SQLManagementStudio_x64_ENU.exe** application (Note: x64 installers are for 64 bit operating systems only. If you have a 32 bit system get the x86 files from the Microsoft SQL download site.

SQL Server 2008 R2 Setup					
Installation Type Specify whether you want to pe	erform a new installation	or add features to an e	xisting instance of SQ)L Server.	
Setup Support Rules Installation Type License Terms Feature Selection Installation Rules Disk Space Requirements Error Reporting Installation Configuration Rules Installation Progress Complete	Select this optio components suc Add features to a SQLEXPRESS Select this optio you want to add	or add shared features n if you want to install a th as SQL Server Manag an existing instance of S n if you want to add fea I the Analysis Services f an instance must be the	ement Studio or Inte QL Server 2008 R2 	gration Services. instance of SQL (Server. For example,
	Instance Name	Instance ID	Features	Edition	Version
	SQLEXPRESS	MSSQL10_50.SQLE			10.52.4000.0
			Back Next	: > Car	icel Help

Figure 148 Microsoft SQL Server Management Studio Install Dialog

- This is the initial screen after running the **SQLManagementStudio_x64_ENU.exe** application.
- Select the New Installation or add shared features option
- Click Next.
- The next screen shown is the license agreement. Accept and click Next.

📸 SQL Server 2008 R2 Setup			
Feature Selection Select the Express with Advanced	Services features to install.		
Setup Support Rules Installation Type License Terms Feature Selection Installation Rules Disk Space Requirements Error Reporting Installation Configuration Rules Installation Progress Complete	Features: Instance Features Shared Features Management Tools - Basi SQL Client Connectivity S Redistributable Features		Description: Server features are instance-aware and have their own registry hives. They support multiple instances on a computer.
	Select All Unselect All Shared feature directory: Shared feature directory (x86):	c:\Program Files\Microsoft Si c:\Program Files (x86)\Micros	
		< Back Next	> Cancel Help

Figure 149 Microsoft SQL Server Management Studio Feature Selection Dialog

- Select All and ensure the Management Tools Basic gets checked
- Click Next
- Skip the error reporting and click next on the next screen
- The Management tools will now install

5.1 Database Attachment Instructions for Microsoft SQL Server 2008 Express

To attach the Echo[®] database you must run the SQL Server 2008 R2 Express program. This is accomplished by selecting **Start**| **All Programs**| **Microsoft SQL Server 2008 R2** | **SQL Server Management Studio** as shown below.

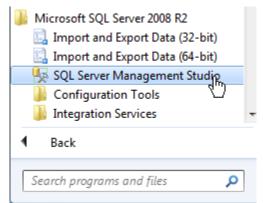


Figure 150 Launch Microsoft SQL Server Management Tools

The first time it runs it will ask you to wait while it configures itself. it will then display the window shown in Figure 151 but the 'Server name' will be < Your PC Name>\SQLEXPRESS

Onnect to Server	
Microsoft* SQL	Server "2008 R2
Server type:	Database Engine 🔹
Server name:	CACCIEN\SQLEXPRESS -
Authentication:	Windows Authentication 🔹
User name:	PCD'
Password:	
	Remember password
Connec	t Cancel Help Options >>

Figure 151 – SQL Server Connection Dialog

Clicking the 'Connect' button will bring up the larger SQL Server application window of which the left pane is shown below. On this pane;

- Right click the **Database** item to reveal the options shown in Figure 152 below
- Select 'Attach' as shown

• This will bring up the Attach Databases dialog shown in Figure 153

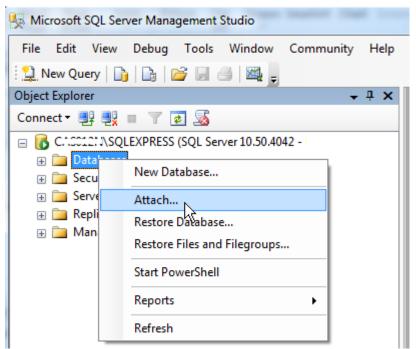


Figure 152 – SQL Server Database Attachment Dialog

JAttach Databases	_			
Select a page General	🕵 Script 🔻 🛐 Help			
	Databases to attach:			
	MDF File Location	Database	Attach As Owner	Status Message
			Add	Remove
	Database details:	File Type Current F		
Connection	Original File Name	File Type Current F	nie ratni M	essage
Server: (V\SQLEXPRESS				
Connection:				
View connection properties				
Progress			Add Catalog	Remove
Ready				,
			0	K Cancel

Echo[®] Monitoring Software User's Manual

Figure 153 – SQL Server Database File Attachment Screen

- On the Attach Databases Dialog Click the 'Add' button
- On the subsequent File dialog select the Echo[®] database, EchoSQLData.mdf.
- This will return you to the **Attach Databases** Dialog shown above where you will click the **OK** button

6 Create a File DSN ODBC Connection

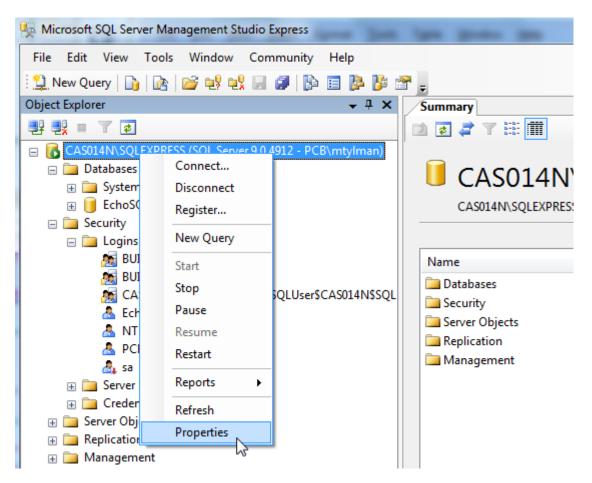
When utilizing the Echo[®] Monitoring Software in Echo[®] Data Presentation mode, it is unlikely the user will have the database engine with the Echo[®] Database installed locally. Therefore a File DSN ODBC connection must be created to provide the software with a path and access rights to the PC or server where the database is loaded. This process occurs in two steps;

- 1. Create an 'EchoUser' account in the database on the PC that hosts the SQL server
- 2. Create a File DSN entity in the ODBC Data Source Administrator utility on every PC that is running the Echo[®] Data Presentation software.

6.1 Create an EchoUser account in the EchoSQLData database

Complete the following steps to create an account compatible with the DSN methodology.

Run the **Microsoft SQL Server Management Studio** program and log into SQL server with normal Windows Authentication.

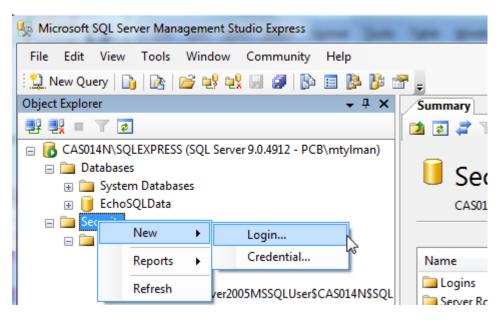


Right-click the server instance in the top left pane as shown above and select Properties

Echo [®]	Monitoring	Software	User's	Manual
			0.001 0	

Server Properties - CAS012N	SQLEXPRESS
Select a page	Script 🔻 📑 Help
Memory Processors Security Connections Database Settings Advanced Permissions	Server authentication Windows Authentication mode SQL Server and Windows Authentication mode Login auditing None Failed logins only Successful logins only Both failed and successful logins Server proxy account Enable server proxy account Proxy account:
Connection	Password:
Server: CAS012N\SQLEXPRESS	Options
Connection: PCB\mtylman PP View connection properties	 Enable C2 audit tracing Cross database ownership chaining
Progress	
Ready	
	OK Cancel

- Select the Security option make sure "SQL Server and Windows Authentication mode" is selected.
- Click OK to close the window.
- Next select 'Security' and right-click and select 'New | Login...'



Create a new login account like the one shown below.

- Enter 'EchoUser' as the login name
- Select SQL Server Authentication
- <u>Make sure Password is blank</u>
- Unselect the Enforce Password Policy if it is selected
- Set the default database to EchoSQLData.
- Remember the login name you will need it later

Login - New			
Select a page	🖾 Script 🔻 📑 Help		
Server Roles User Mapping Securables Status	Login name: Windows authentication SQL Server authentication Password: Confirm password: Specify old password Old password: Enforce password policy Enforce password expiration User must change password Mapped to certificate 	EchoUser	Search
Connection	Certificate name:		
Server: CAS014N\SQLEXPRESS Connection: PCB\mtylman <u>View connection properties</u> Progress Ready	 Mapped to asymmetric key Key name: Default database: Default language: 	EchoSQLData <default></default>	•
			OK Cancel

Server Roles screen - select 'public'

Login - New	
Select a page	Script 👻 📑 Help
Server Roles User Mapping Securables	Server role is used to grant server-wide security privileges to a user.
Status	Server roles:
	bulkadmin dbcreator diskadmin
	processadmin public
	securityadmin serveradmin setupadmin
	sysadmin

User Mapping Screen – Select EchoSQLData as the database and click in the Default schema cell, a button will appear as shown below.

Login - New				• X
Select a page General Server Roles	🖾 Script 🔻 🎼 Help			
User Mapping Securables	Users mapped to this login:			
Securables	Map Database	User	Default Schema	
	EchoSQLData			- F
	master			15
	model			
	msdb			
	tempdb			
Connection	Guest account enabled for: Database role membership for: I			
Server: CAS014N\SQLEXPRESS	db_backupoperator db_datareader			
Connection:	db_datawriter			
PCB\mtylman	db_ddladmin db_denydatareader			
View connection properties	db_denydatawriter db_denydatawriter db_owner			
Progress	db_securityadmin			
Ready	V public			
			ОК	ancel

Click the button in the Default schema cell and the 'Select Schema' screen is displayed as shown below. Click the 'Browse button. Next find and select the 'dbo' option and click OK

Select the	se object types:	
Schemas	Object Types	
Enter the	object names to select (<u>examples</u>):	
	Check Names Browse	
	OK Cancel Help	
Browse	for Objects	Σ
13 objects	were found matching the types you selected.	2
13 objects	were found matching the types you selected.	2
13 objects	were found matching the types you selected. objects: Name Type	
13 object: Matching	were found matching the types you selected. objects: Name Type	
13 object: Matching	were found matching the types you selected. objects: Name Type [db_denydatareader] Schema [db_denydatawriter] Schema	
13 objects Matching	were found matching the types you selected. objects: Name Type [db_denydatareader] Schema [db_denydatawriter] Schema	

Close out of these screens using the ok buttons and the User Mapping should now appea
as shown below. Make sure you select db_owner as indicated in the bottom pane.

ОК

[guest]

15 3

Schema

Cohomo

Help

Cancel

Ŧ

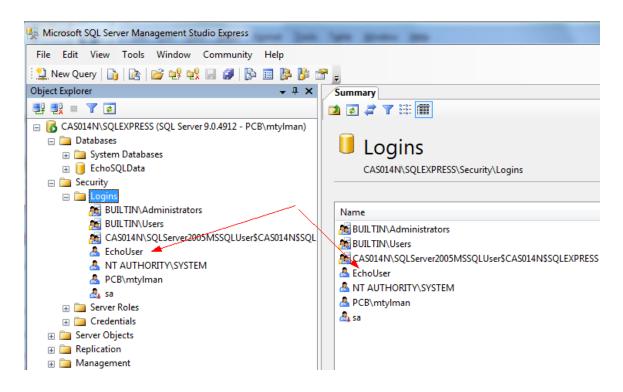
Login Properties - EchoUser	後回タマニ酸				
Select a page Page General	🔄 Script 🔻 📑 Help				
Server Roles	Users mapped to this login:				
Securables	Map Database	User	Default Schema		
Status	EchoSQLData	EchoUser	dbo		
	master				
	model				
	msdb				
	tempdb				
Connection	Guest account enabled for: Database role membership for: f				
	db_accessadmin				
Server: CAS014N\SQLEXPRESS	db_backupoperator				
	db_datareader				
Connection: PCB\mtylman	db_ddladmin				
View connection properties	db_denydatareader db_denydatawriter db_owner				
Progress	db_securityadmin				
Ready	V public				
			ОК	Cancel	

Next ensure the Securables and Status screens look like the one below

Login Properties - EchoUser				X
Select a page	🔄 Script 🔻 🛐 Help	p		
Server Roles User Mapping Securables Status	Securables:	oUser	Add	Type
Connection	Explicit permissions:			
Server: CAS014N\SQLEXPRESS Connection: PCB\mtylman	Permission	Grantor	Grant With	Grant Deny

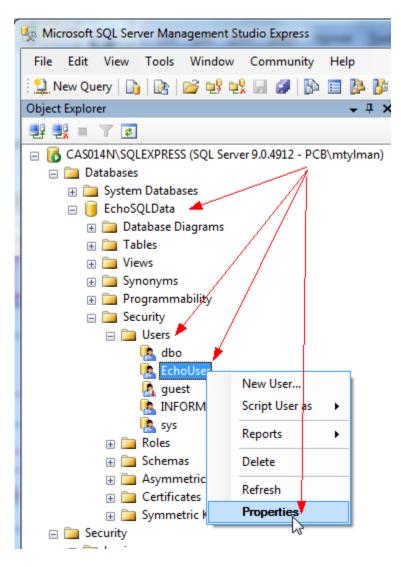
Login Properties - EchoUser		
Select a page	Script 🔻 📑 Help	
Server Roles User Mapping Securables	Settings	
Status	Permission to connect to database engine: Grant 	
	Deny Login:	
	 Enabled Disabled 	
	Status	
	SQL Server authentication:	
	Login is locked out	

EchoUser should now show up in the logins screen



Echo® Monitoring Software User's Manual

Next under the EchoSQLData DB select; Security | Users | EchoUser | Properties



📔 Database User - EchoUser		
Select a page	🖾 Script 🔻 🛐 Help	
Securables	User name:	EchoUser
	Ogin name:	EchoUser
	Certificate name:	
	Key name:	
	Without login	
	Default schema:	dbo
	Schemas owned by this user:	
	Owned Schemas	
	db_accessadmin	
	db_backupoperator	E
	db_datareader	
	db_datawriter	
	db_ddladmin	
Connection	db_denydatareader	-
Server: CAS014N\SQLEXPRESS	Database role membership:	
Connection:	Role Members	A
PCB\mtylman	db_datareader	
Image: Section Properties	db_datawriter	
	db_ddladmin	
Progress	db_denydatareader	E
Ready	db_denydatawriter	
nouvy	db_owner	
- P	db_securityadmin	v
		OK Cancel

Make SURE that db_owner is set or messages like the following may occur when it is accessed through the DSN File method:

DSN File:

Error -2147217911 occurred at NI_Database_API.lvlib:Conn Execute.vi->DataBase Query.vi->DB Connection Test Dialog.vi

Possible reason(s): ADO Error: 0x80040E09 Exception occured in Microsoft OLE DB Provider for ODBC Drivers: [Microsoft][ODBC SQL Server Driver][SQL Server]The **SELECT permission was denied on the object** 'Sensor', database 'EchoSQLData', schema 'dbo'. in NI_Database_API.lvlib:Conn Execute.vi->DataBase Query.vi->DB Connection Test Dialog.vi OR UDL: Error -2147217911 occurred at NI_Database_API.lvlib:Conn Execute.vi->DataBase Query.vi->DB Connection Test Dialog.vi Possible reason(s): ADO Error: 0x80040E09

Exception occured in Microsoft SQL Native Client: **The SELECT permission was denied on the object 'S**ensor', database 'EchoSQLData', schema 'dbo'. in NI_Database_API.lvlib:Conn Execute.vi->DataBase Query.vi->DB Connection Test Dialog.vi

6.2 Part 2 – create an ODBC connection file on the client PC

In order to facilitate SQL database access to retrieve Echo[®] data on a remote PC or server by the Echo[®] Data Presentation software, an Open Database Connectivity (ODBC) interface needs to be established. The preferred mechanism is configuring a UDL file to do this. You may be able to use the supplied UDL file found in c:\PCB\Echo\Database

😋 🔵 🗢 📗 🕨 Computer 🔸 Local Drive (C:) 🕨	PCB → Echo → Database →	
File Edit View Tools Help		
Organize 🔻 📑 Open 🔻 Burn New	folder	
☆ Favorites	Name	
💻 Desktop	🗿 Echo Sensor Import Template.xlsx	
🐌 Downloads	🗐 EchoData.dsn	
📃 Recent Places	🛒 EchoDataSQL.udl	

Double click on it to open it

Data Link Properties		
Provider Connection Advanced All		
Specify the following to connect to SQL Server data: 1. Select or enter a server name:		
MyPCNName>\SQLEXPRESS		
2. Enter information to log on to the server: Use Windows NT Integrated security		
Use a specific user name and password:		
User name: EchoUser		
Password:		
Blank password Allow saving password		
Select the database on the server:		
Echo SQL Data 🗸		
Attach a database file as a database name:		
EchoSQLData		
Using the filename:		
Test Connection		
OK Cancel Help		

- Change the item 1 to be <your server>
- Change Item 2 to Use a specific user name and password and click 'Blank password'.
- Set item 3 to point to the EchoSQLData database
- Click the Test Connection button and see the following dialog. If the test connect succeeded then your connection file is complete. Use the UDL file in your receiver configuration process.

Microsoft Data Link	ſ
Test connection succeeded.	
ОК	

Alternatively an ODBC Data Source Name (DSN) file can be created. Following are the steps to create a DSN file in Windows 7; however, Windows 10 is very similar.

File Edit View Tools Help	Control Panel Items Administrative Tools		earch Administrati
Organize - 🔟 Open Burn			
🚖 Favorites	Name	Date modified	Туре
🧾 Desktop	P Component Services	7/13/2009 9:57 PM	Shortcut
〕 Downloads	🛃 Computer Management	7/13/2009 9:54 PM	Shortcut
🕮 Recent Places	Data Sources (ODBC)	7/13/2009 9:53 PM	Shortcut
	Event Viewer	7/13/2009 9:54 PM	Shortcut
🧮 Desktop	🔝 iSCSI Initiator	7/13/2009 9:54 PM	Shortcut
🥽 Libraries	🛃 Local Security Policy	2/11/2010 10:56 PM	Shortcut
Documents	Performance Monitor	7/13/2009 9:53 PM	Shortcut

Start | Control Panel | Administrative Tools and open Data Sources (ODBC).

E.C.	SODBC Da	ata Source Administrator
	User DSN	System DSN File DSN Drivers Tracing Connection Rooling About
	Look in:	Database
		Remove Configure
		Set Directory
		An ODBC File data source allows you to connect to a data provider. File DSNs can be shared by users who have the same drivers installed.
		OK Cancel Apply Help

- Select the File DSN Tab
- Use the browse button to find the c:\PCB\Echo Monitoring\Database directory
- Select Add

Create New Data Source	he he	's Manual	×
	Select a driver for which you wa	nt to set up a data so	urce.
	Name	Version	Com
	SQL Server SQL Server Native Client 10.0	6.01.7601.17514 2009.100.4042.00	Micro Micro
	< <u> </u>	Advanc	► ed
	< Back	Next > Ca	ncel

• Select SQL Server as the driver and click Next

Create New Data Source		×
	Type the name of the file data source you this connection to. Or, find the location to clicking Browse. EchoSQLData	want to save o save to by Browse
	< Back Next	Cancel

• Enter a name for the file you are creating and click Next

Create New Data Source		×
	When you click Finish, you will create the data which you have just configured. The driver ma for more information.	
	File Data Source Filename: EchoSQLData Driver: SQL Server	*
	*	
	< Back Fini	Cancel

• Click the finish button

Create a New Data Sourc	e to SQL Server	
	This wizard will help you create an ODBC data source that you can use to connect to SQL Server.	
	What name do you want to use to refer to the data source?	
	Name: EchoSQLData	
	How do you want to describe the data source?	
	Description: Echo SQL Data	
	Which SQL Server do you want to connect to?	
	Server: CAS012N\SQLEXPRESS	
Finish Next > Cancel Help		

- Enter a description
- Enter the Server where the database resides. If the database engine is SQL Express then be sure to add '\EXPERSS' after the PC name, if not just the name is correct.

Create a New Data Source	e to SQL Server	
	How should SQL Server verify the authenticity of the login ID?	
	 With Windows NT authentication using the network login ID. With SQL Server authentication using a login ID and password entered by the user. 	
	To change the network library used to communicate with SQL Server, click Client Configuration.	
	Client Configuration	
	Connect to SQL Server to obtain default settings for the additional configuration options.	
	Login ID: EchoUser	
Password:		
< Back Next > Cancel Help		

- Select 'With SQL Server authentication...'
- Enter EchoUser and the Login ID and leave the password blank
- Click the Next button

Create a New Data Source	e to SQL Server
	 Change the default database to: Echo SQLData Attach database filename: Attach database filename: Create temporary stored procedures for prepared SQL statements and drop the stored procedures: Only when you disconnect. When you disconnect and as appropriate while you are connected. Use ANSI quoted identifiers. Use ANSI nulls, paddings and warnings. Use the failover SQL Server if the primary SQL Server is not available.
	< Back Next Cancel Help

Getting to this screen indicates a connection to the server has been established

• Leave this screen as it is and click Next.

Create a New Data Source	e to SQL Server		
	 Change the language of SQL Server system messages to: English Use strong encryption for data Perform translation for character data Use regional settings when outputting currency, numbers, dates and times. Save long running queries to the log file: C:\Users\mtylman\AppData\Local\Temp\QUERY.L Browse Long query time (milliseconds): 30000 Log ODBC driver statistics to the log file: C:\Users\mtylman\AppData\Local\Temp\STATS.L(Browse 		
< Back Finish Cancel Help			

• Leave this screen as it is and click Finish.

ODBC Microsoft SQL Server Setup	x
A new ODBC data source will be created with the following configuration:	
Microsoft SQL Server ODBC Driver Version 06.01.7601	*
Data Source Name: Echo SQLData Data Source Description: Echo SQL Data Server: CAS012N\SQLEXPRESS Database: (Default) Language: (Default) Translate Character Data: Yes Log Long Running Queries: No Log Driver Statistics: No Use Regional Settings: No Prepared Statements Option: Drop temporary procedures on disconnect Use Failover Server: No Use ANSI Quoted Identifiers: Yes Use ANSI Quoted Identifiers: Yes Data Encryption: No	
	Ŧ
Test Data Source OK Canc	el

• When this screen appears click 'Test Data Source'

SQL Server ODBC Data Source Test	x	
Test Results		
Microsoft SQL Server ODBC Driver Version 06.01.7601	*	
Running connectivity tests		
Attempting connection Connection established Verifying option settings Disconnecting from server		
TESTS COMPLETED SUCCESSFULLY!		
	Ŧ	
ок		

This screen indicates a successful connection to the database has been established. The $Echo^{(i)}$ Monitoring should now be able to access data in it.