

- Provides a complete, integrated system for unattended Safeguards monitoring when used with LANL MINIGRAND, ISR, AMSR, and MCA instruments
- A complete solution, providing instrument measurement data and state of health in real time
- Easily expandable: supports up to 50 instruments via 30 channels
- Flexible interfacing via RS-232-C and ILOM
- Support of key measurement instruments in unattended Safeguards applications
- Wide area networks are easily configured, using Internet communications
- Support for the APC UPS allows continued operation during power failure

The Multi-Instrument Collect (MIC) software is designed for unattended collection and saving of data from multiple, distributed data acquisition instruments in unattended monitoring applications in nuclear Safeguards. Developed at the Los Alamos National Laboratory, it communicates with, configures, controls, monitors, and interrogates a variety of instruments<sup>1</sup> gathering data pertinent to the unattended monitoring application. The purpose of MIC is to monitor and archive the readings from the attached instruments, showing an alarm flag if any of the readings are out of limits or if there is a communications failure. It is highly configurable, supporting collection of data from up to 50 instruments on up to 30 communications channels. MIC also provides the ability to copy data to removable disks for exporting the data it collects. MIC is a multi-tasking application. It is designed to function on a fast multi-processor system but can run adequately on a single-processor platform.

## Overview

MIC runs in unattended mode. The program collects data from the data acquisition instruments via one or more Intelligent Local Operating Network (ILOM), ILOM serial extensions, or serial communications lines. Data collection is automatic and will continue until the operator intervenes. All raw data are stored in files, one per day per instrument, on the hard disk. Critical events and maintenance files are also kept, one per day per instrument, on the hard disk. Each record is time stamped. MIC has the ability to transmit limited state of health data in real time to multiple receivers via an attached network. This network may be connected to the Internet, allowing state of health monitoring anywhere in the world or may be limited to a local Ethernet segment or it may be deactivated completely.

Support is also provided for an American Power Conversion “smart” un-interruptible power system. Implementing this capability can extend the duration of non-loss of data during a power failure by a factor of ten or more.

It is expected that approximately every 30 days the collected data will be copied to removable disks for export to a post-acquisition review program and for off-system archiving. An auxiliary support program, MicXfer.exe, can be configured to automatically transfer the files MIC creates to another system.

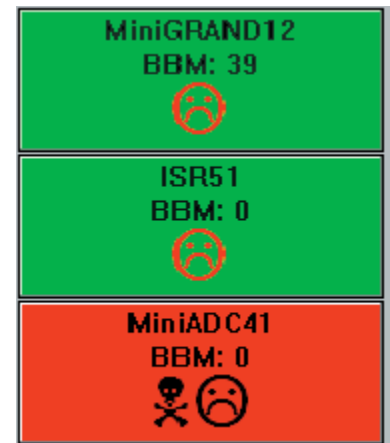
## MIC In Use

A colored button on the MIC main dialog exists for each configured instrument. The background color of the button indicates the current status of the instrument. Red signifies a problem communicating with the instrument; green is the normal quiescent state; and yellow indicates “waiting for a command response.” The name of the instrument and the number of bytes in battery backed-up memory is also displayed. Icons are displayed within the button to indicate various state of health information.

Clicking on the button will cause a multi-page tabbed dialog box to be displayed, with a number of function tabs: Setup, Data Status, Monitor Parameters, Modify Parameters Summary, and Legend (which allows convenient instrument setup, monitoring, status review, or troubleshooting).

## MIC Instrument Support

MIC supports a variety of measuring instruments. In each case, it copies data placed in the battery backed-up memory of the acquisition device to the collect computer’s hard drive. It will display recently-received information and will detect improper mode of operation of the instrument. If the instrument has been placed in any mode other than “monitor” mode, it will command the instrument into the correct mode. If for some reason the instrument stops responding to the support object, a reset sequence will be sent.



<sup>1</sup>Specifically: GRAND3 and MINIGRAND, the ISR and AMSR, and the MCA/1K ADC. In addition, the American Power Corporation Un-Interruptible Power System (UPS) is supported, to enable extended system availability in the event of power loss.

# MIC-B32 Multi-Instrument Collect Software

The following instruments are currently supported by MIC:

GRAND3 and MINIGRAND  
ISR and AMSR  
MCA/1K ADC

## MIC Communications

MIC communicates with attached instruments in one of three ways: ILON network, serial direct to the instrument, or ILON as an "extension cord" to a serial instrument.

## UPS Support

The American Power Conversion Un-Interruptible Power System may be used to extend the data collection time during an external power loss. In the event of a power failure MIC will move all of the data accumulated in the battery backed-up memory of all instruments to the collect computer's hard disk and then safely power down the collect computer. The APC UPS will bring the system back up after a user-selected period — typically 1 to 2 hours later. If the external power has not returned, all of the instruments will again copy the battery backed-up data to the hard drive and again the system will shut down. This type of cycling can extend the non-loss of data operational period from 1 or 2 hours up to 18 or 20 hours.

## Configuration

Instruments are easily added to and configured from MIC. After clicking on the "Add Instrument" button the user will be prompted for the type of instrument and the name of the instrument.

Once installed, instruments are easily configured by MIC.

## MIC Ancillary Programs

There are a number of support programs that enhance the functionality of MIC. Each program provides a function or capability which is more appropriately done in a separate program rather than embedded in MIC:

### Multi-Program Startup Service (MPSS)

Periodically verifies each program on a user-modifiable list is currently running. If MPSS discovers a particular program is not running, it will be restarted by MPSS.

### MicXfer

Automatically and periodically copies files from a set of source locations to a set of destination locations

### Tracker

Receives and displays limited state of health information sent by MIC and displays it

### Dump

Performs simple statistical analysis of the binary data files MIC creates

### MsgUtil

Deciphers individual messages received from each of the supported instruments

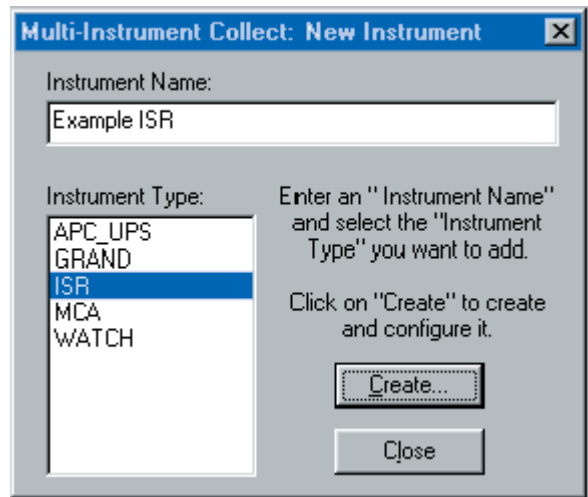
### DelFi

Deletes files in a set of directories after they reach a specified age

## Ordering Information

To order, specify:

Model	Description
MIC-B32	Multi-Instrument Collect software and documentation
MIC-G32	Multi-Instrument Collect documentation only



Specifications subject to change  
040306

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