



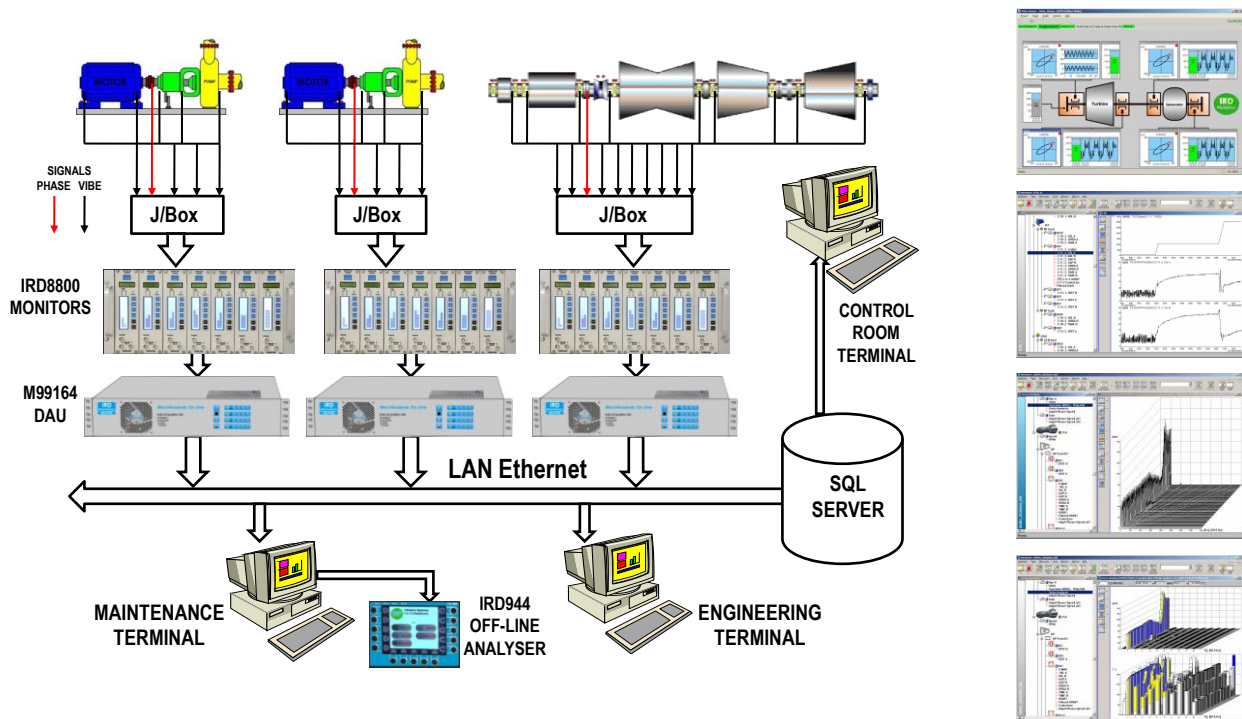
**IRD9900 – Diagnostic On-Line System (DOLS)  
for Rotating Machinery**

The IRD Mechanalysis model IRD9900 is a Diagnostic On-Line System (DOLS) for high integrity multi-channel parallel data acquisition and diagnostics for machinery protection monitors or transmitters. In general, the IRD9900 will be used in conjunction with model IRD8800 Machinery Protection Monitors (API670 compliant) for simultaneous capture of machinery vibration and process data. The system can also be used as a standalone portable or be connected to existing monitor installations requiring modernisation where a buffered time wave form signal is available. Alternatively the system can power a wide range of sensors directly when connected as a 'stand-alone' multi-channel analyser on a network for volume sensors such on paper machine rolls or wind generator farms.

The IRD9900 system is a powerful tool for trending and incident capture for start up and shut down conditions. It is essential for post trip diagnostics on strategic rotation machinery such as turbine generators and/or balance of plant when identifying the cause of an incident for subsequent corrective action and production planning.

IRD9900 is a multiple channel simultaneous data acquisition system for the complete plant. Many hundreds of channels can be continuously monitored providing maintenance departments with total plant health information at any PC terminal on the plant network. Operations in the Control Room have MIMIC displays indicating machinery alarms with the ability to drill down to the cause of the fault indication. In addition to dynamic AC vibration signals, the unit accepts up to 16 DC channels of process data such as load, temperature etc. Optional on-line dynamic rotor balancing can be undertaken at each DAU. The IRD9900 system also integrates with the portable 4 channel vibration analyser model **IRD944** using the same common network software.

**SYSTEM ARCHITECTURE:** The system architecture shows conceptual turbine and balance of plant machinery where data is collected simultaneously and saved locally by each Data Acquisition Unit (DAU) before being transmitted to the main SQL Server. All data is accessible and when analysed, is comparable as each sample is time stamped and, where applicable, related to phase/tacho shaft position. The IRD9900 system is based on standard Microsoft® application software that is well proven and familiar to most users. Thus upgrades and reduced obsolescence offer greater maintainability providing long term user value.



**OPERATOR INFORMATION DISPLAYS:** An effective plant information system has to be operator friendly. By converting data into actionable information, it enables operations to take informed decisions to optimise plant uptime. The IRD9900 Diagnostic On-line System software provides a wide range of standard and customised displays to suit the needs of the user. Control Room Operators have the familiar MIMIC screen giving an overview of the plant status. Any warning or alarms indications will direct the Operator to 'drill down' for more detailed information.



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Maintenance and Planning engineers have more detailed information available for precise fault identification and better maintenance management decisions. The associated **INTERPRETER** software reads a vibration spectrum thus taking the engineer through an intelligent decision support process that ensures all likely faults are considered.

The prime screen displays cover but are not limited to the following:

Multi-level Plant to Machine Architecture	Single Point Trends	Vibration Spectrum
Overview 'Traffic Lights' Alarms	Multiple Point Trends	Spectrum Waterfall
Overall Values	Start up	Shaft Centre Line
Orbits	Coast Down	Order Analysis
Polar Plots	Amplitude + Phase Values on Speed Frequency	Frequency bands values

**SPECIFICATION OF MODEL IRD9900 SERIES DATA ACQUISITION UNIT (DAU)**

**Construction:** Designed to work alongside API670 on-line machinery protection monitors, the 19" Rack has a rugged construction. Input terminals are at the rear for signal cables as well as communication connectivity. The use of epoxy-glass circuit boards with gold plated connector contacts; solid-state circuitry and virtually wire-free modular assembly enhances reliability. Ventilation is provided by internal fans. With a keyboard and VDU, each unit operates like an individual PC.



**Channels:** The IRD9900 series DAU is currently available in the following configurations with associated part numbers:

PART NUMBER	DYNAMIC AC CHANNELS	STATIC DC CHANNELS	TACHO PHASE
M99082	8	8	2
M99164	16	16	4

Selected DAUs have more or less channels, refer to applicable part numbers; the common features are summarised below:

**SPECIFICATION**

**TECHNICAL DATA**

<b><u>DYNAMIC (AC) VIB. CHANNELS</u></b>	: 16 synchronous (P/N M99164) / 8 synchronous (P/N M99082) vibration channels
Frequency range	: 25600 Hz
Sampling frequency	: 65.5 KHz
Input range	: +/- 12V (only one range, no gains)
Measurement timing	: Fully synchronous
A/D Resolution	: 24 bit input, 64 bit double floating point internal precision (No gain procedures used)
Dynamic range	: 120 db
Channel configuration	: Voltage or ICP (individually for every channel)
Input protection	: 30 volts
Input impedance	: 100k ohm
Input type	: Acceleration, velocity, displacement, any non-vibration AC voltage
Integration	: Single, double
2D Processing	: Axis rotation according sensor mounting
Accuracy	: < 0.5 %
ICP drive	: 18 V, 3.8 mA
High pass filter	: 1Hz -12800 Hz (user definition)
Low pass filter	: 25Hz -25600 Hz (user definition)
Connector	: Terminal box



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**SPECIFICATION**

**TACHO**

- Number : 4 independent tacho inputs (P/N M99164) / 2 independent tacho inputs (P/N M99082)
- Speed range : 0.8 Hz - 1000 Hz
- Input impedance : 80k ohm
- Input type : Voltage
- Input range : + 10V (only one range, no gains)
- Accuracy : <0.5 %
- Triggering : Positive or negative
- Trigger level : 0.1 -9.9 V, user defined
- Input protection : 48 volts
- Connector : Terminal box

**STATIC (DC) PROCESS SIGNALS**

- Channels : 16 Chls (P/N M99164) / 8Chls (P/N M99082)
- Input range : 4-20mA DC
- Input impedance : 250 Ohm
- A/D Resolution : 12 bit input
- Accuracy : 0.1% fsd
- Input protection : 30 volts

**MEASUREMENT FUNCTIONS**

- Triggering : Free run, Tacho, External (voltage)
- Data acquisition : Overall values: (True RMS, True Peak, True Peak-Peak, uses high and low pass filters)
- “ : Time signal (65 536 samples max), Real-time FFT, Order analysis
- “ : Envelope demodulation (Bearing analysis with 30K bearing data in software)
- “ : Speed measurement
- “ : Process static DC values
- “ : ACMT procedure for low speed machines bearings
- Time waveform : 256 - 65,536 samples
- Spectrum range : 25 - 25,600
- Spectrum lines : 100 - 25,600
- Order analysis parameters : 1/2 - 10th order
- Averaging : 1 - 255
- Gap and Shaft Centreline displays : Yes

**ACQUISITION CONTROL:** (executed by M99700 series software)

User defines Time Controlled Groups (TCGs). Each group is the set of measurements which are taken in specified time interval. The user can collect measurements every second, every minute or at any other determined time interval. TCG is free run or can be triggered by any measurement, which exceeds the pre-defined limit. Data are finally saved to MS SQL Server database.

SOFTWARE MODULES	PART NOS	Refer to User Guide for details and available displays
System: Data Acquisition Interface	M99716	Interface to each DAU model M99082/M99164 installed
Simultaneous data acquisition (site License) MS SQL	M99750	A variety of options are available depending on existing site installation or end user IT strategy
Advanced Diagnostic Analysis. Includes 30,000 bearing data base.	M99760	System administrator, set up and configuration required for each site. The data dongle can be moved between PCs for analysis
On-Line View only, supplied per Seat	M99770	Provides for additional views of most data stored
On-Line Current' short term data, View Only per Seat.	M99775	Applicable for small installations with no DCS displays - Optional



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**SPECIFICATION**

**TECHNICAL DATA**

**GENERAL**

Processor	: Intel Core2 - 2.5 GHz
RAM	: 2 GB
Internal data disc	: 250 GB
Interface	: Ethernet 1GB RJ45
Power supply	: AC 110-240volts, 45-65Hz
Dimensions: Panel Cut-Out	: 442mm(W)x87mm(H) (Can also be supplied in a portable enclosure for field analysis)
Weight	: 9 kg (P/N M99164) / 7.5 kg (P/N M99082)

**TYPE TESTS**

- The following primary Type Tests have been passed and remain current:
- : Dry Heat Cyclic, IS:9000 P-III
  - : Damp Heat Cyclic, IS: 9000 P-V
  - : Bump IEC 68-2, Vibration IEC 68-2, Humidity IEC 68-2
  - : CE Mark, European Union – IEC61326 EMI/EMC and IEC61010 Safety

**ENVIRONMENTAL**

Temp	: -10°C - +50°C, (15°F-120°F) Operating
Humidity	: 95% none condensing

**COMPLEMENTARY SYSTEMS**

**PART Nos      PURPOSE**

<b>On-Line Balancing</b>	: M99675	The two channel dynamic rotor balancing utility is an optional extra to the main <b>M99750</b> software suite.
<b>Decision Support Software</b>	: Interpreter	This expert software utility reads and analyses the vibration spectrum to assist the diagnostician in interpreting machine fault indications
<b>API 670 Protection Monitors</b>	: IRD8800	The IRD Mechanalysis model <b>IRD8800</b> range of on line high integrity monitors are designed with buffered output to the IRD9900 Diagnostic On-line System
<b>Four Channel Site FFT Analyser</b>	: IRD944	The IRD Mechanalysis model <b>IRD944</b> will integrate on the same IRD9900 software platform for off line diagnostics and in depth studies.

IRD Mechanalysis® Ltd continues to be an industry leading provider of Condition Management Solutions. With a heritage of over 60 years experience in machinery vibration and associated technologies, IRD designs, manufactures and supports proven instrumentation suitable for harsh industrial environments.

The **Vibration People** of IRD Mechanalysis can be contacted at the following branches or your local distributor:

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