

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Visit our website - *Click HERE*



RCB-2000
Digital Receiver System
Ground Products/Microdyne



FEATURES

Microdyne's Model RCB-2000 compact receiving system unit combines two high performance telemetry RF sections, a dynamic Pre-Detection Diversity Combiner, a DSP-based Multi-mode Demodulator with programmed FIR IF and Video Filters, and an optional programmable Bit Synchronizer within a single 3 rack-unit chassis. The receiving system offers the following features and performance characteristics:

- **Dual Channel RF sections with multiple first and second IF bandwidths, an internal Pre-D AM/AGC Controlled Diversity Combiner, a Wideband DSP-based Digital Multimode Demodulator, and optional Bit Sync.**
- **Excellent Adjacent Channel Rejection by using multiple SAW First IF bandwidth filters along with highly selectable FIR second IF filters.**
- **Optimal Ratio Combiner using high speed AGC/AM driven control signals.**

L3 communications
Telemetry & RF Products

Excellence You Can Measure

Features (Continued)

- Superior handling of Fast/Deep fades (50 kHz Combiner Break Frequency).
- Multiple, User selected second IF FIR preprogrammed filters. Bandwidths from 50 kHz to 30 MHz are available for each channel. The unit comes preprogrammed with all IRIG filters. Other bandwidths can be programmed (consult factory).
- Multimode FM, PM, AM, BPSK, QPSK/OQPSK Demodulator
- Compatible with both conventional Auto-Tracking Antenna Systems and Linear Predictor Antenna Tracking Systems (common in Phased Array Antennas)
- Small, lightweight & rugged design
- Easy to use Front Panel and Remote Control via RS-232, Ethernet and IEEE-488.
- Windows Application Software supplied, providing remote operation of front panel controls via Ethernet interface.

OPTIONS:

- Internal programmable Single Channel Bit Synchronizer with data rates from 30 kbps to 20 Mbps, NRZ and Biphase -L, M & S. Also includes de-interleaver and 3 bit soft decision per I and Q outputs.
- Dual Channel Bit Synchronizer (See separate data sheet for the 3362 Bit Sync).
- Multi-Band Tuners
- 3 Channel record Down Converter (CH1, CH2, Combined)
- Feher Patented *FQPSK Demodulation
- Channel 1 and Channel 2 Multimode Demodulators
- Trellis FM Demodulator for improved performance

*Feher Patented FQPSK Technologies

"Cleared by DoD/OFOISR for public release under OFOISR Case No. 04-S-0072 on July 26, 2004"

RCB-2000 APPLICATIONS

Applications Include:

- Data Reception
- AM Tracking Receiver
- Signal Analysis
- Satellite TT&C
- Satellite image reception
- Aircraft testing and evaluation
- Video reception from RPV/UAV vehicles
- Expendable launcher data collection
- Unmanned telemetry sites requiring complete computer control
- Low Earth Orbit (LEO) satellite data collection
- Mobile tracking and data systems
- Microdyne has been manufacturing general and special purpose receivers and combiners for over 30 years and continues to be the undisputed leader in telemetry receiving products which enable highly sophisticated data and signal processing over a wide frequency spectrum. The RCB-2000 exemplifies this leadership with state-of-the-art performance in a compact, easy-to-use form factor.

RCB-2000 BENEFITS

RCB-2000 Digital Receiver System *- leading edge technology and performance*

This advanced digital technology with flexibility will provide customers with viable technology as requirements develop for years to come. This phenomenal design has resulted in a broad array of benefits.

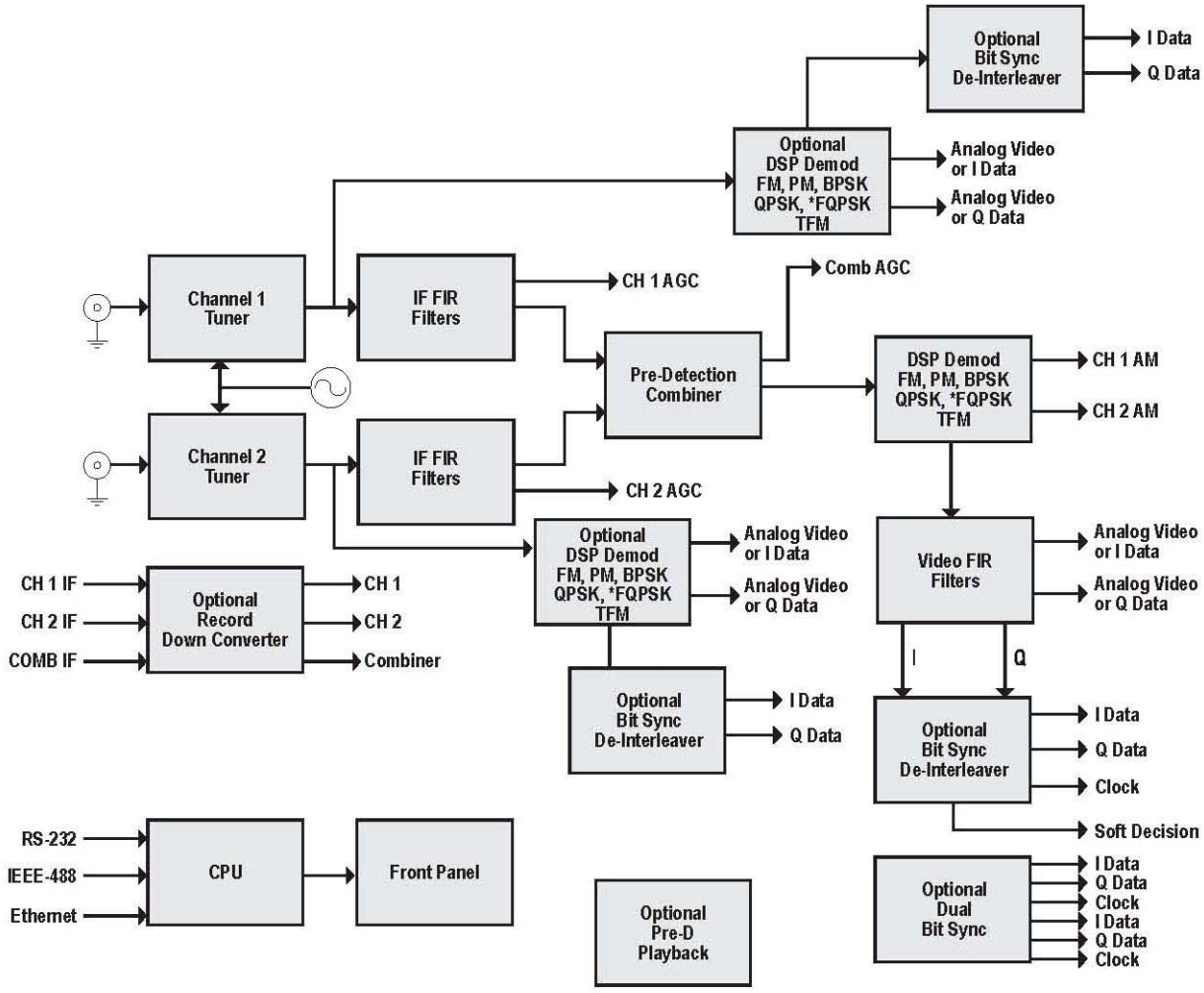
BENEFITS:

- Internal bit synchronizer eliminates need for external components
- Easy-to-use front panel controls all operations resulting in saving setup time, eliminating errors and resolving status issues
- Programmed digital FIR filters eliminate costly IF upgrades
- Two RF Sections and one Combiner in a single package

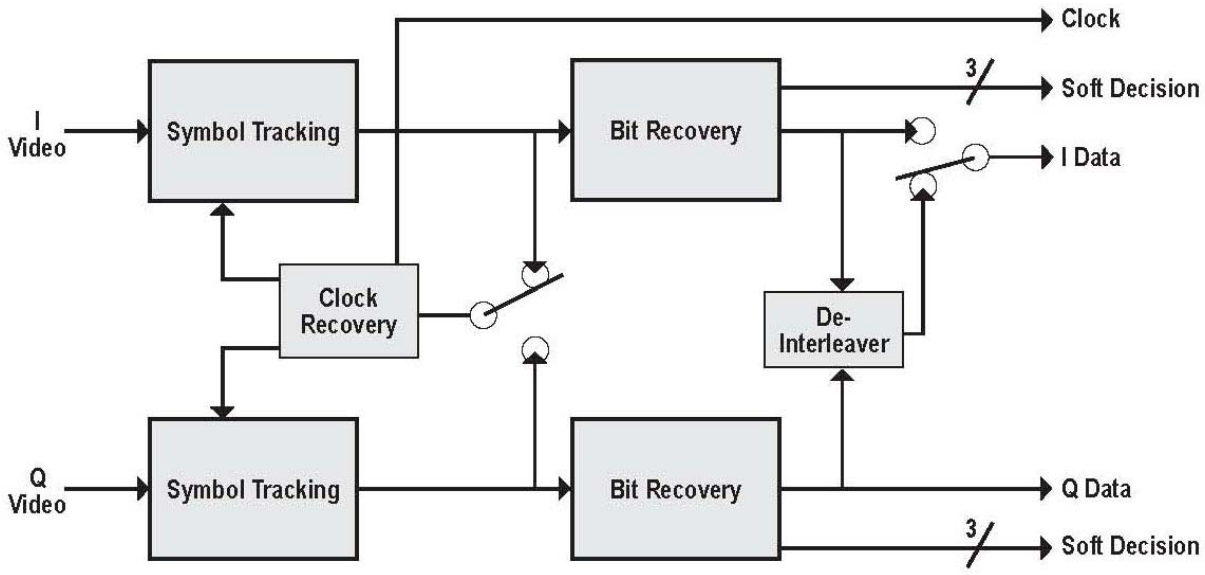
REDUCES:

- Rack Space
- Power consumption
- Rack wiring problems
- Cost
- Weight
- Remote control complexities
- Spares
- Maintenance issues

Block Diagrams



Single Bit Synchronizer Block Diagram



TUNER

The RCB-2000 contains a dual channel tuner in the base unit covering the same frequency band with an option to add up to two additional tuner bands. Tuners are controlled by a common LO phase locked to an internal or external reference.

Available frequency ranges include: 2185 MHz to 2485 MHz, 1429 MHz to 1545 MHz, 1700 MHz to 1850 MHz, 215 MHz to 320 MHz, 130 MHz to 180 MHz, 400 MHz to 500 MHz, and 900 MHz to 950 MHz. The tuner's center frequency can be selected with a resolution of 100 kHz either from the front panel or by remote control. For other frequency ranges, consult the factory.

The RCB-2000 Series has both an internal 10 MHz reference oscillator and the ability to use an external 10 MHz.

AM detection is provided after the 2nd IF FIR filters, providing excellent adjacent channel rejection. The AM frequency response is determined by selection of the AGC time constant and the IF bandwidth. Individual AM outputs are provided for each tuner in the standard configuration.

Envelope AGC is derived from a peak AM detector with five selectable time constant settings.

A programmable manual gain control is provided for each RF Section, which is controlled through the remote digital interface or by the front panel.

The RCB-2000 provides the capability to freeze the gain of the receiver with the remote digital interface or via the front panel. Receiver gain is held to the value at the time the Freeze command is detected.

AGC monitor outputs are provided for each RF section. An AGC zero capability is provided to optimize the performance of the Pre-Detection Combiner. Adjustment of this offset does not affect AGC slope. Auto zero capability is programmable through the remote digital interface or through the front panel. A single control for each receiver channel zeros the AGC monitor outputs.

Additional signal strength record outputs are provided with switchable output polarity.

TUNER SPECIFICATIONS

RF

Dual Conversion Superheterodyne

Frequency Ranges Available

2185-2485 MHz,
1429-1545 MHz,
1700-1850 MHz
215-320 MHz
830-1130 MHz
130-180 MHz
400-500 MHz
900-950 MHz
(others available)

Second IF Center Frequency

70 MHz

AM Output Level

2 Vp-p into 75 ohm for 50% modulation

Envelope AM Frequency Response

High end response 50 kHz
Low end response determined by AGC TC

Receiver LO Stability

±1.5 ppm

AGC Type

Envelope

AGC Time Constants

0.1, 1, 10, 100, 1000 mS

Receiver Tuning Resolution

100 kHz

Manual Gain, AGC Freeze

Variable by digital control

Noise Figure

8 dB maximum

Image Rejection

60 dB

Input Impedance

50 ohms (unbalanced)

VSWR

1.5:1 Typical, 2.0:1 max

Operating Dynamic Range

Threshold to -10 dBm

Maximum Input

+10 dBm

IF Rejection

70 dB min., 80 dB typical

Spurious Rejection

60 Db

First LO Type

Synthesized

DIVERSITY COMBINER

The RCB-2000 provides circuitry for diversity pre-detection combining of the incoming signals. The combining takes place at 70 MHz. Selections are offered through the front panel or through the remote interfaces to perform Optimal Ratio Combining, Optimal Select Combining, or the combiner can be bypassed to monitor either RF input channel.

When operating under normal conditions, the AGC levels from the tuners are a true measure of the quality of the received data, and combiner weighting is a direct function of these levels. Certain applications, (high multipath environments, for example), may require that the combiner weighting include the addition of an AM component. This is handled in the combiner where the AM component is summed with the AGC levels to provide optimal combining under high fade rate conditions.

The Pre-Detection Combiner provides 2.5 dB signal-to-noise improvement with equal S/N ratio inputs. (With unequal inputs S/N ratio) S/N combiner = 10 log (pr1 + pr2) - .5 dB. Where Pr1 = C/N power ratio CH1 and Pr2 = C/N power ratio of CH2.

DIGITAL FIR IF FILTERS

The internal pre-programmed FIR Second IF filters provide bandwidths from 50 kHz to 30 MHz without the need for module replacement.

Bandwidth selection is made through the remote interfaces or by the front panel. All standard IRIG filters are included. Contact factory for additional filter requirements.

The standard delivered FIR filters offered are as follows: 50 kHz, 100 kHz, 150 kHz, 250 kHz, 300 kHz, 375 kHz, 500 kHz, 750 kHz, 1 MHz, 1.3 MHz, 1.5 MHz, 2 MHz, 2.4 MHz, 3 MHz, 3.3 MHz, 4 MHz, 5 MHz, 6 MHz, 7.5 MHz, 10 MHz, 12 MHz, 15 MHz, 20 MHz, 22 MHz, 25 MHz, 30 MHz.

DIGITAL MULTI-MODE DEMODULATOR

The Multi-Mode Demodulator employs the latest application specific technology in processing the 70 MHz IF signal. The demodulator provides FM, PM, BPSK, QPSK/OQPSK., and optional *FQPSK operation. Data rates of up to 20 Mbps can be supported. The flexible nature of the demodulator and its associated IF and video filtering allows it to be used for a wide range of applications and it can easily be reconfigured as applications change.

Two analog video outputs are provided for monitoring both I & Q channel video signals in QPSK/OQPSK. Programmed FIR video filters provide maximally flat group delay filters. Video filters are provided with the -3 dB bandwidths from 150 kHz to 15 MHz.

Video filter values are as follows: 150 kHz, 187.5 kHz, 250 kHz, 375 kHz, 500 kHz, 750 kHz, 1 MHz, 1.2 MHz, 1.5 MHz, 1.65 MHz, 2 MHz, 2.4 MHz, 2.5 MHz, 3 MHz, 3.3 MHz, 3.75 MHz, 4 MHz, 5 MHz, 6 MHz, 7 MHz, 7.5 MHz, 10 MHz and 15 MHz.

Custom video filter bandwidths can be implemented by changing the receiver firmware (contact factory).

The RCB-2000 provides user controllable video output levels with 63 dB levels in 1 dB steps. The user can also control the video coupling (AC/DC) and video polarity.

DEMODULATOR SPECIFICATIONS

Demodulation Modes

FM, PM, AM, BPSK,
QPSK/OQPSK
*FQPSK (Option)
Trellis FM (Option)

Acquisition and Tracking

±250 kHz

Doppler Tracking Center Frequency

2.8125 MHz nominal

Reference Stability

±1.5 ppm

Video Output Level (Adjustable)

4 Vp-p nominal, 8 V pp max

Video Bandwidths

Digital FIR

Video Output Impedance

75 ohms unbalanced

Reference Oscillator

10 MHz Internal, 5 or 10 MHz External

CHANNEL 1/CHANNEL 2 DEMODULATOR (OPTIONAL)

- Allows for demodulation of both the Channel 1 and Channel 2 IF Signals

RECORD TAPE CARRIER (OPTIONAL)

Record carrier outputs are available as an option for each receiver channel and for the combiner. Record carrier frequencies, selectable through the remote digital interface or through the front panel, are in 25 kHz steps from 25 kHz to 20 MHz. The record carrier output level is 1 V RMS. The output impedance is 75 ohms.

PROGRAMMABLE BIT SYNCHRONIZER (OPTIONAL)

An optional programmable Bit Synchronizer is available inside the RCB-2000 supporting data rates up to 20 Mbps per channel. The outputs of the bit sync are NRZ-L data with clock along with three soft decision bits for I & Q channels. The user can select the following:

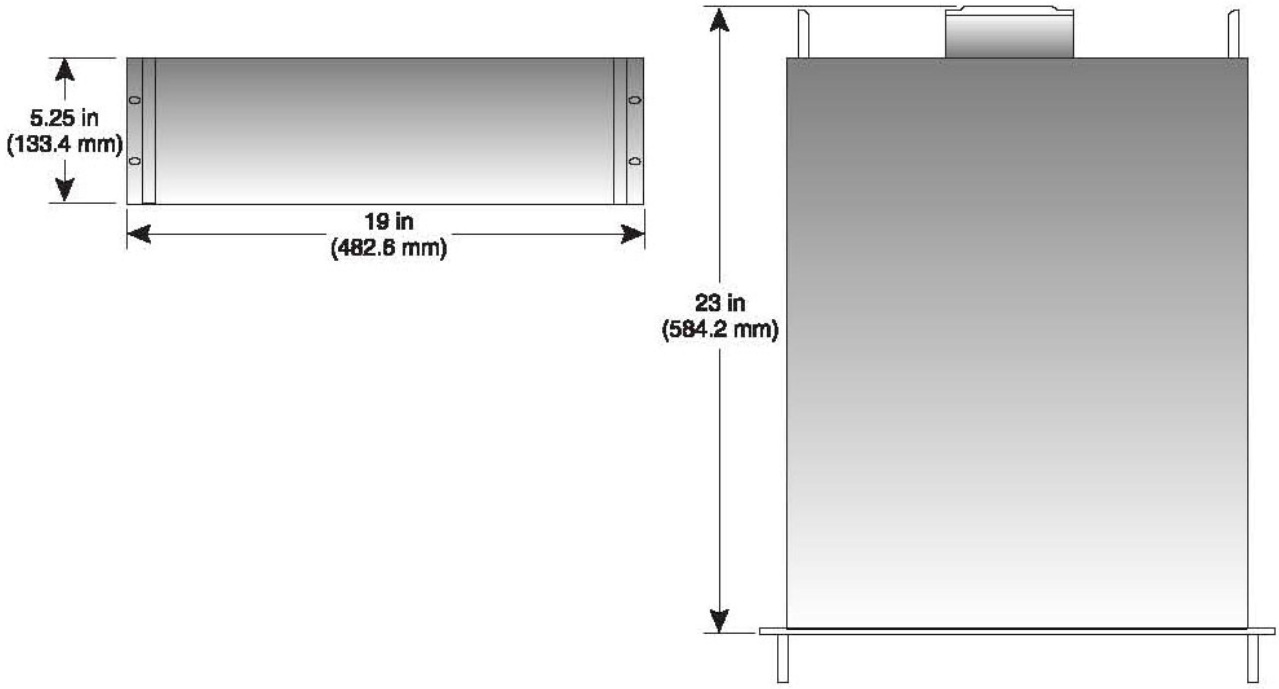
- Input code - NRZ-L/M/S, Bi-Phase-L/M/S
- Bit Rate - 30 kbps to 20 Mbps (NRZ-L) per channel
- De-interleaver - in or out (10 Mbps maximum)
- Clock and data polarity per channel maximum control
- 15 bit Derandomizer on or off

Settings can be changed via the front panel or through the remote digital interface.

PROGRAMMABLE DUAL BIT SYNCHRONIZER (OPTIONAL)

- Two Fully Independent Bit Synchronizers (See separate data sheet for 3362)
- Allows for QPSK Bit Synchronization of I & Q Data

Outline Drawing



General Specifications

Graphics Display Type	Electroluminescent
Graphics Display Size	3" x 8.25"
Graphics Display Color	Amber on Black
Data Entry	16 Button Keypad
Stored Setups	Stores up to 9 setups in non-volatile memory
AGC Modes	AGC, Manual Gain, AGC Freeze
Interface Baud Rate	Up to 19.2 Kbps
Remote Interface Formats	Ethernet, IEEE-488.1, RS-232

Operating Temperature Range	0 to 50 degrees C
Non-Operating Temperature Range	-55 to +65 degrees C
Humidity	Up to 90% non-condensing
EMI/RFI	Designed to meet 89/336/EEC
Dimensions	5.25" H x 19" W x 22" D
Weight	Less than 40 lbs.
Power Requirements	115/230 VAC (auto select) 50 - 400 Hz 200 watts maximum

Connector	Function	Connector Type
J1	115/230 VAC, 50-400 Hz auto select	IEC-320 Appliance AC connector with strain relief
J2	RF Channel 1 Input, 50 ohm unbalanced	N
J3	RF Channel 2 Input, 50 ohm unbalanced	N
J4	Video Out 1, nominal 4 Vp-p, 75 ohms	BNC
J5	Video Out 2, nominal 4 Vp-p, 75 ohms	BNC
J6	Signal Strength Record Channel 1, 0 to +5 V or -5 V into a 1K load	BNC
J7	10 MHz Reference Out, 50 ohms	BNC
J8	AM Channel 1 Output, 2 Vp-p for 50% AM, 75 ohms	BNC
J9	AGC Channel 1, 0 to -5 V into a 1K load	BNC
J10	IF Channel 1 Out, 70 MHz, -10 dBm, 50 ohms	BNC
J11	Record Out CH. 1 (option), 75 ohms	BNC
J12	Signal Strength Record Channel 2, 0 to +5 V or -5 V into a 1K load	BNC
J13	10/5 MHz Reference In, 50 ohms	BNC
J14	AM Channel 2 Output, 2 Vp-p for 50% AM, 75 ohms	BNC

Connector	Function	Connector Type
J15	AGC Channel 2, 0 to -5 V into a 1K load	BNC
J16	IF Channel 2 Out, 70 MHz, -10 dBm, 50 ohms	BNC
J17	Record Out CH. 2 (option), 75 ohms	BNC
J18	OR'D AM 2Vp-p for 50% AM, 75 ohms	BNC
J19	OR'D AGC , 0 to -5 V into a 1K load	BNC
J20	IF Combined Out, 70 MHz, -10 dBm, 50 ohms	BNC
J21	Record Out Combined (option), 75 ohms	BNC
J22	Doppler, 2.8125 MHz	BNC
J23	Bit Sync Outputs - Soft decision,Clock and Data, (TTL levels)	Type "D", 15 pin female
J24	Accessory	Type "D", 25 pin female
J25	RS-232C Interface	RS-232C Standard 9 pin, Type "D" female
J27	Ethernet, 100Base-TX	RJ-45 Socket
J28	IEEE-488.1 Interface	IEEE-488.1 Standard
J29	CLK	BNC
J30	NRZ I	BNC
J31	NRZ Q	BNC

Note: Rear panel configuration may vary depending on the options chosen.

NOTE: Rear panel configuration may vary depending on the options chosen.



Printed in USA / QN-0152A-RCB-2000.wrd/September 2003
All trade names and product names referenced are trademarks, registered trademarks, or trade names on their respective holders.

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP