MR4 METER ADAPTER RECORDER
Software and Hardware
Manual

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MR4 METER ADAPTER RECORDER

Software and Hardware Manual

The information presented in this manual is believed to be adequate for the intended use of the product. If the product or its individual instruments are used for purposes other than those specified herein, confirmation of their validity and suitability must be obtained from Megger. Refer to the warranty information below. Specifications are subject to change without notice.

WARRANTY

Products supplied by Megger are warranted against defects in material and workmanship for a period of one year following shipment. Our liability is specifically limited to replacing or repairing, at our option, defective equipment. Equipment returned to the factory for repair must be shipped prepaid and insured. Contact your Megger representative for instructions and a return authorization (RA) number. Please indicate all pertinent information, including problem symptoms. Also specify the serial number and the catalog number of the unit. This warranty does not include batteries, lamps or other expendable items, where the original manufacturer's warranty shall apply. We make no other warranty. The warranty is void in the event of abuse (failure to follow recommended operating procedures) or failure by the customer to perform specific maintenance as indicated in this manual.

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INTRODUCTION TO HARDWARE

Congratulations on your purchase of Megger MR4 Meter Adapter Recorder. These are complete, digital signal processor based (DSP) recorders, totally contained in a standard universal ring or ringless type meter adapter. They are designed for monitoring split phase 200A residential or light commercial services.

Emphasis of the instrument and software design is on reliability, simplicity and ease of use. Features and instrument operation were developed by working closely with several large power utility companies. At Megger we always think of our customers, which is why we made the MR's field upgradeable by using FLASH PROM technology. You can update the firmware and get the latest new features without returning them to the Megger factory.

The MR4 Meter Adapter Recorder is a four channel voltage and current recorder, which records the following values:

- True RMS voltage, minimum and maximum
- True RMS current, minimum and maximum
- Voltage and current swells and sags
- Voltage and current histogram data
- Voltage and current regulation data
- Voltage and current sub-cycle events
- Voltage and current harmonic events
- Suspected loose neutral
- Flicker events

IMPORTANT: *Register your Recorder* **NOW** *- fill out the enclosed card.*

SEE ALL OF OUR PRODUCTS ON THE WEB AT:

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WARNINGS AND SAFETY PRECAUTIONS

WARNING!

Death, serious injury, or fire hazard could result from improper use/installation of this instrument.

Read and understand this manual before installing this instrument.

Installation of this instrument MUST be performed in compliance with the National Electric Code (ANSI/NFPA 70-1993) and any additional safety requirements applicable to your installation.

Installation, operation and maintenance of this instrument MUST be performed by qualified personnel only. The National Electrical Code defines a qualified person as "one familiar with the construction and operation of the equipment and the hazards involved."

SAFETY PRECAUTIONS!

The following safety precautions MUST be taken whenever the MR4 is installed:

- Wear safety glasses and insulated gloves when making connections to power circuits

- Hands, shoes and floor/ground must be dry when making any connection to a power line.

- Before each use, inspect all bus bars for breaks/cracks. Replace immediately if defective.

These warnings and safety precautions are to be used where appropriate when following instructions in this manual.

CAUTION!

The MR can be used with meter forms 2S, 12S and 25S only. In addition, no live bus or voltage can be allowed to come into contact with the neutral blade when the MR is installed in the 6 o'clock or 9 o'clock positions. Failure to follow these instructions may result in irreparable equipment damage, personal injury, or both.

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THEORY OF OPERATION

How the MR Collects Data

The MR4 has four input channels. Two of the channels record the line to neutral voltage on line 1 and line 2. The other two channels record line 1 and line 2 current. It also computes and records the line-to-line voltage as the difference between the line 1 and line 2 voltages, and the neutral current as the sum of the line 1 and line 2 currents.

Using Metrosoft, you can determine which parameters the MR will record.

There are several time intervals that are used by the MR for storing and calculating RMS voltage and current values. These time intervals are: sample rate, response time and storage interval.

Sample Rate: The sample rate is the rate at which the inputs are sampled. The sample rate is fixed at 256 samples per cycle per channel (15,360 samples per second). Each sample provides an instantaneous value of each input voltage and current. These instantaneous values (samples) are used to calculate the true RMS voltage and current values. At this sample rate, the MR can detect sub-cycle events as short as 65 microseconds in duration.

Response Time: The response time determines how many samples are used to calculate RMS voltage and current values. Using Metrosoft you set the response time to ½, 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30 or 60 cycles. For example, if you select a 2-cycle response time, the Recorder will use 512 samples (256 samples/cycle x 2 cycles) to compute the RMS values. This will be repeated every 2 cycles, and the values determined in each response time will be temporarily stored until the end of the data storage interval.

Storage Interval: The storage interval dictates how often the data values are stored. At the end of each storage interval, the MR searches the readings collected, and stores the minimum RMS, interval RMS and maximum RMS voltage and current values. For example, if the response time is set to 1 cycle and the storage interval is set to 2 minutes, then at the end of 2 minutes you will have 7,200 readings per channel (since that's how many cycles there are in 2 minutes). Of the 7,200 readings, the MR saves the lowest 1 cycle (minimum RMS), the highest 1 cycle (maximum RMS) and the

RMS value (interval RMS) over 2 minutes. Megger uses this memory technique to allow recording for days or weeks. Using Metrosoft, you can set the storage interval from 1 second to 6 hours.

Metrosoft automatically computes the maximum recording time for you based on the selections you make when setting up the Recorder for a test.

The MR comes standard with a memory capacity of 33,000 readings. An expanded memory options available for a memory capacity of 500,000 readings.

Exceedance Recording Only

You can set up the MR to record only when one or more inputs exceed specified limits. Since the MR does not record readings in the "normal" range in this mode, the recording time can be much longer than continuous recording allows. In addition, the data storage interval can be set to very short times, which is ideal for capturing fast events such as motor starts, etc.

Swell/Sag Event Recording

Metrosoft allows programming the MR to save detailed information on swells and sags (out-of-limit events), in addition to recording the minimum RMS, interval RMS and maximum RMS values per storage interval.

You specify the swell (high) and sag (low) limits. The MR compares each computed RMS value to the limits. As soon as any one input exceeds a specified limit, the MR will document the date and time the swell/sag event started and stopped, the duration of the swell/sag event, and the minimum RMS, interval RMS and maximum RMS values on all inputs during the swell/sag event.

NOTE: The programmed response time affects the swell/sag event capture. A shorter response time allows for greater accuracy in detecting swells and sags. This can result in capturing smaller swell and sags that could be missed with a longer response time. A longer response time can result in capturing only the most important swell and sag events.

NOTE: It is highly recommended that limits ALWAYS be set and turned on. This may yield valuable information. Since swell/sag event data resides in separate dedicated memory, recording time is NOT sacrificed by using this feature.

Sub-Cycle Event Capture

Metrosoft allows programming the MR to capture and record sub-cycle events.

You specify the sub-cycle event limits. The MR compares each sample within the present cycle to each corresponding sample of the previous 2 cycles. Any time a single sample differs from the previous corresponding samples by more than the

specified limit, a sub-cycle event is recorded. The MR will document the date and time the sub-cycle event started and stopped, along with the duration and magnitude of the sub-cycle event.

Sub-Cycle Event

The reported sub-cycle value in the out of limits detailed report is equivalent to the amount of deviation of the sample of one waveform to the corresponding sample of the previous waveform.
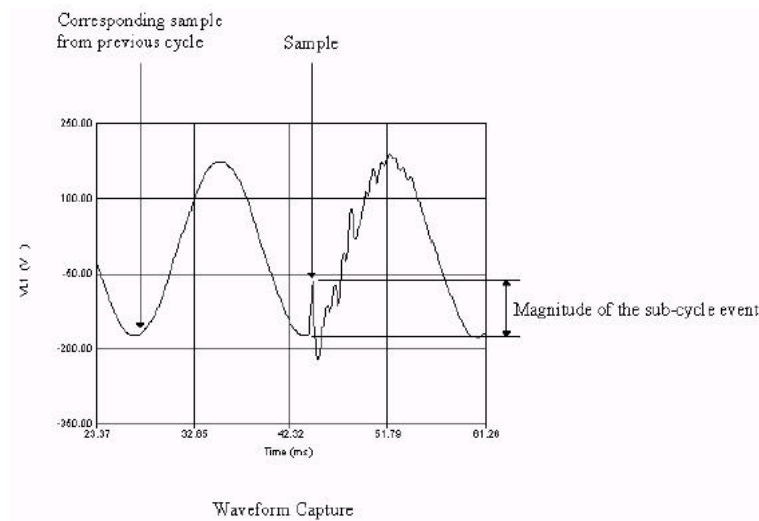
Figure 1: Waveform Capture

Loose Neutral

Using Metrosoft, the MR can be programmed to detect conditions that indicate a possible loose neutral connection. While checking for a loose neutral, the MR will still record RMS values and other events.

The loose neutral indication operates on the voltage inputs. Using Metrosoft, you define the detection threshold and the number of occurrences. The MR detects whether or not the voltages differ by more than the programmed detection threshold. If this occurs more than the programmed number of times, the loose neutral LED will light. The LED will remain lit until data is cleared from the MR.

Flicker Recording

Using Metrosoft, you can set up the MR to record voltage flicker events. You can set up the criteria that determine a flicker event by selecting flicker time periods, magnitude of fluctuation and number of fluctuations. By default, Metrosoft sets the flicker criteria to the GE flicker curve.

To detect flicker events, the MR compares each voltage sample to the baseline voltage, and looks for fluctuations that match the flicker criteria specified. The baseline voltage is based on the RMS voltage measured over 1 minute. The MR determines a new baseline voltage every minute.

For each flicker event detected, the MR records the date and time of the flicker event, the channel that the event occurred on, and the number of fluctuations that occurred during the event.

Understanding Flicker Recording Mode Operation

Flicker Table: Table in Metrosoft which defaults to GE Flicker Curve values. User has ability to change if so desired.

Time Period	Magnitude of Fluctuation	Number of Occurrences
10 Sec.	1.0%	1
1 Min.	1.3%	10
15 Min.	2.2%	10
30 Min.	2.6%	10
1 Hr.	3.2%	10
4 Hrs.	4.8%	10
8 Hrs.	5.8%	10
12 Hrs.	6.2%	10

Response Time: User programmable period of time in which True RMS value is determined.

One Minute Rolling Average: Last one minute average of all response time TRMS values.

time

last one minute rolling average

Response time TRMS value
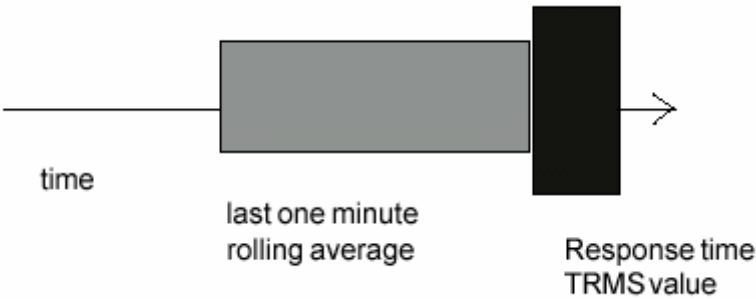
A. At each response time interval, determine the True RMS value.

B. Determine one minute rolling average.

C. Calculate the percent difference, or Magnitude of Fluctuation, of the TRMS value from the rolling average.

D. If Magnitude of Fluctuation is greater than or equal to the level specified in the flicker Table, store the time stamped occurrence in the appropriate bin.

E. If during the bin's monitoring period timeframe we exceed the allowed number of occurrences, we categorize this as a flicker event, and store the occurrence away to be reported in the Flicker Report.

Example Flicker Report:

Start Date	Time	Time Period	Magnitude Fluctuation	Number of Occurrences
09/30/94	11:20:52	10 Sec	1.0%	3

Harmonic Events

During each response period, the MR can continuously monitor the total harmonic distortion (THD) of the voltage and current inputs. If the THD exceeds a specified limit, the MR will document the date and time the harmonic event started and stopped, along with the duration and maximum THD of the event.

Histogram Data

Histograms show the percentage of samples that fall within each 5V or 5A range for all data that was recorded. For example, for voltage, you can see the percentage of data that was in the 120.0V to 124.9V range, and the 125.0V to 129.9V range, etc. This provides information to quickly access the voltage and current levels which include most of the data.

Regulation Data

For regulation data, the MR records separate RMS values for each 24-hour period, for 10, 12, 15, 20 or 30-minute intervals. This data allows you to see time related trends in voltage and current regulation over a period of many days.

Clock Hour Orientation

The MR uses clock hour orientation to make it easier for you to correlate and compare data from multiple recorders.

The MR divides an hour into a whole number of storage intervals. When asked to record, the MR will delay recording until its internal clock reaches the beginning of one of these storage intervals. For example, if the MR is programmed with a 1-minute storage interval and is asked to begin recording at 09:37:12, it will wait 48 seconds and begin recording at 09:38:00.

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When the storage interval is greater than 1 hour, the MR will delay recording until its internal clock reaches the beginning of the next hour. In the above example, if the MR were programmed with a 1-hour storage interval, it would wait 22 minutes 48 seconds and begin recording at 10:00:00.

Memory Full Condition

The data memory in the MR is divided into 3 areas. One area is used to record up to 300 swell, sag, sub-cycle and THD events. Another area is used to store up to 300 flicker events. The third area is used to store RMS data and waveforms.

You may use Metrosoft to set up the MR to either stop recording when out of memory (Stop-when-Full), OR to continue recording by wrapping to the start of memory and overwriting the oldest recorded data with the most recent data (Wrap-Around).

The memory mode selected effects recording RMS data as well as events.

With Stop-when-Full memory mode, the MR will stop recording when the portion of memory containing RMS data is full. If the portions of memory containing events become full, the MR will stop recording events, but will continue to record RMS data.

With Wrap-Around memory mode, all portions of memory (RMS and events) will wrap to the start of memory and overwrite the oldest data with the most recent data until recording is stopped.

Recording Times

When programming the Power Analyzer, Metrosoft will calculate your recording time based on the programmed setup. When performing these calculations, the software also takes into account the number of inputs being used, the number of values being saved (minimum RMS, average RMS and/or maximum RMS), and the memory capacity, whether or not to capture waveform, the waveform capture rate, if any and expected events.

Waveform capture can have a big impact on recording time. Should your unit stop recording before expected, check to see how many waveform captures were recorded. You can then enter this number into the expected waveform # of events box under program/waveform in the software. Click **calculate max record time** to see how your record time was impacted by actual waveforms captured.

The following chart lists the approximate maximum recording times for a Recorder with a memory capacity of 33,000 readings (standard memory) and a Recorder with a memory capacity of 500,000 readings (optional - expanded memory), when saving minimum RMS, interval RMS and maximum RMS readings:

Unit	Storage Interval	33,000 Readings	500,000 Readings
MR4 (2/6 inputs on)	1 Minute	1 Day, 7 hrs.	19 Days, 12 hrs.
	2 Minutes	2 Days, 14 hrs.	39 Days
	5 Minutes	6 Days, 11 hrs.	97 Days, 11 hrs.

NOTE: Recording times have been rounded to the nearest hour.

NOTE: Recording times reflect the amount of time the MR can record RMS data. Recording times are not affected when the MR records events (swell, sag, sub-cycle, THD and flicker, since this data is stored in a separate portion of the MR's memory, but waveform capture greatly affects recording time.

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GETTING STARTED QUICKLY

This set of brief instructions will get you started with the MR quickly and give you a general understanding of how the MR and Metrosoft are used. It will take you through the basic steps required to use the MR.

If you have used other Megger Recorders before, or if you are comfortable using instrumentation, this will probably give you the information you need to get started. Please refer to the remainder of this manual for detailed instructions.

Where appropriate, each of the steps in these instructions refer you to the correct section of this manual for detailed information.

NOTE: *If you haven't already done so, please read Chapters 1 (Introduction) and 2 (Warnings and Safety Precautions) before using the MR.*

To get started quickly, follow these steps:

1. Use the charging cable to charge the MR's internal battery. Do this right away, as it takes 24 hours to fully charge the battery. See *Charging the Internal Battery* in the *Powering the MR* section in Chapter 5 for help.

2. Use Metrosoft to program the MR for the desired settings. This automatically sets the MR's real time clock. See the *Metrosoft Software* section for details on this procedure.

3. Take the MR to the field and install it on the meter socket. Be sure to set the RECORD switch in the ENABLE position. See *Installing the MR* in Chapter 5 for help. Be sure to check that the MR record LED is ON or flashing. This confirms the unit is either recording or waiting to record.

Once recording is complete, retrieve the MR. Make sure you set the RECORD switch to the DISABLE position before disconnecting the MR from the meter socket. See *Disconnecting/Uninstalling the MR* in the *Installing the MR* section in Chapter 5 for help.

4. Connect the MR to the battery charger (part #ps-MR) to turn the unit on to allow data retrieval.

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5. Connect the MR to your computer using the RS-232 cable.

6. Use Metrosoft to transfer data and to create graphs and reports.

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DETAILED MR OPERATING INSTRUCTIONS

The instructions in this chapter assume that you have reviewed Chapter 1 (*Introduction*), Chapter 2 (*Safety Precautions*), Chapter 3 (*Theory of Operation*) and Chapter 4 (*Getting Started Quickly*) in this manual. If you have not yet reviewed these Chapters you should do so at this time.

The MR comes with a rechargeable sealed lead acid battery, bus bar assemblies, a neutral clip lead and fuses.

An RS-232 cable (part #ca-MR) and a battery charger (part #ps-MR) are required to use the MR.

Refer to the following diagram(s) for connecting the battery charger cable, connecting the RS-232 cable, locating the display, LEDs and RECORD switch, and for installing the MR:
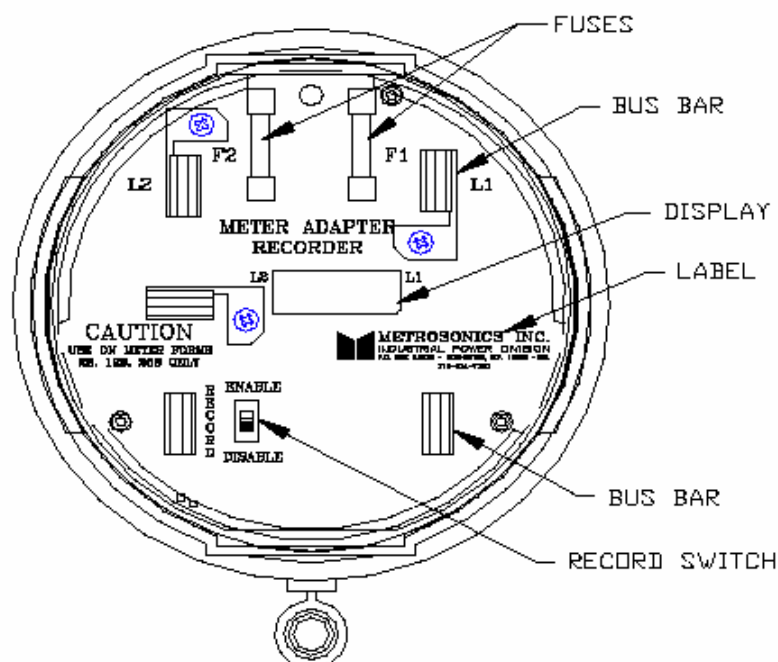
Figure 2: MR Top View
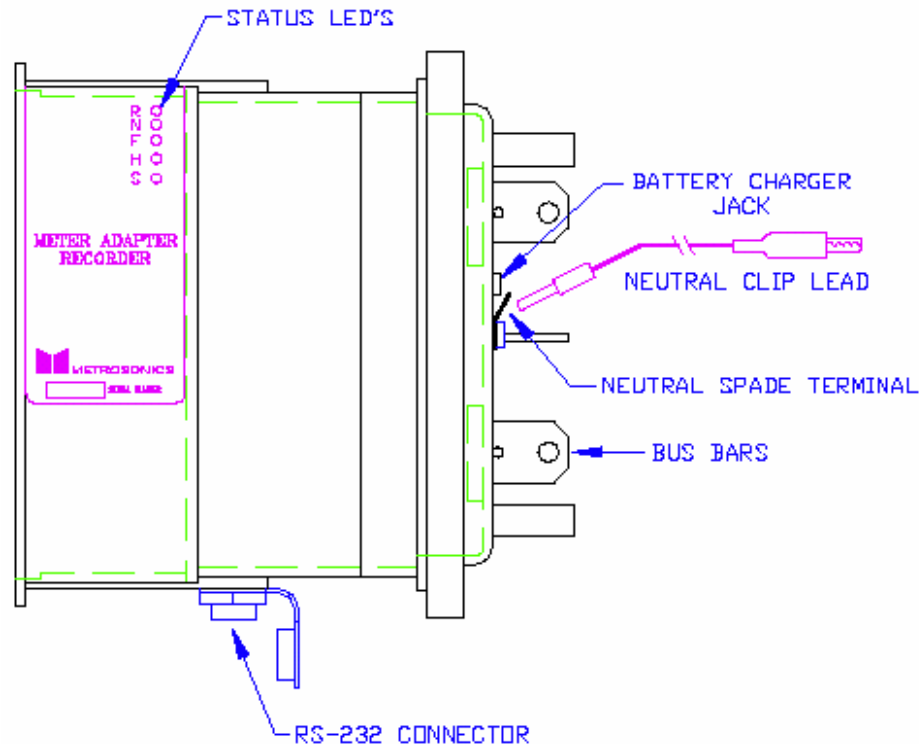
Figure 3: MR Side View

Powering the MR

The MR gets its operating power from one of three sources: the line-to-line voltage in the meter socket, the internal battery or the charging cable.

The internal battery provides power for storing recorder set up information, maintaining the internal clock, and data retention before and after a test. In addition, the battery supplies power to the MR in the event of a power outage. If a power loss occurs (line to line voltage falls below 160V) during recording, the battery will supply power to the MR and it will continue to record for 2 minutes. If power remains below 160V, the MR will shut itself off. Once power is restored, the MR will automatically turn back on and resume recording. This allows the MR to record through short power losses while preventing it from depleting the internal battery to the point of losing data.

Programming and data retrieval cannot be done under battery power alone. The battery charger or a connection to AC power is required for this function. If the battery voltage becomes low, the MR will shut down and save all data and setup information for 14 days. The battery voltage can be checked, per the troubleshooting manual section.

The battery charger provides two functions. In addition to charging the MR's internal battery, it also provides power to the MR to allow data retrieval and programming when it is not connected to a live meter socket. This is especially useful when retrieving data, since it will assure that the MR does not shut down due to low battery voltage in the middle of data retrieval.

Internal Battery and Charger

The battery is automatically recharged while the MR is plugged into a live meter socket. You can also recharge the battery using the battery charger.

Charging the Internal Battery

To charge the internal battery with the charger:

1. Plug one end of the charger into a 120V, 60Hz wall outlet.

2. Plug the other end of the charger into the battery charger jack on the back of the MR.

Complete recharge will occur in 24 hours.

We recommend charging the battery for 24 hours before recording data with the MR. If the MR will not be used for a long period of time, we recommend charging the battery for 24 hours every month, to maintain the recorder's settings. If the battery is allowed to completely discharge, the meter's settings will revert to the factory defaults.

NOTE: Failure to maintain the battery could result in permanent loss of the battery's ability to recharge.

RS-232 Interface Cable

The RS-232 interface cable is used to communicate with the MR through your computer's serial port.

With the cable in place, you can use Metrosoft to perform the following functions:

- Program the MR
- Retrieve data
- Start/stop recording
- Reset the MR's time clock
- Clear data

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Metrosoft also permits viewing various information such as; battery status, recording status, memory left, present input readings and the number of events recorded. See the *Metrosoft Software* section for more details.

NOTE: *To communicate with the unit, it must be connected to an AC source of above 160 Volts or the battery charger.*

RS-232 Cable's Internal Battery

The RS-232 cable requires one 9V alkaline battery. When plugged into the MR, an LED on the cable's battery box shows the status of the battery. If the LED is turned off or is very dim, the battery needs to be replaced.

Refer to the following diagram for replacing the RS-232 cable's battery:
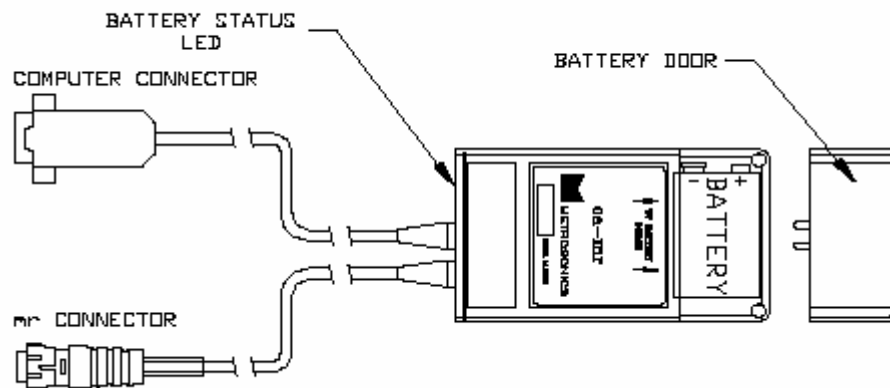

Figure 4: RS-232 Cable Battery Replacement

To replace the RS-232 interface cable's battery:

Slide the battery compartment door open.

1. Remove the old battery and insert a new one, observing the polarity shown on the inside of the battery compartment.

2. Slide the door closed and plug the RS-232 cable into the MR. The battery status LED should be brightly lit.

Connecting the MR to Your Computer

To connect the MR to your computer via the RS-232 cable:

1. Plug the RS-232 cable into the RS-232 connector on the MR and secure it by tightening the threaded collar.

2. Check that the RS-232 cable's battery LED is brightly lit.

3. Plug the other end of the RS-232 cable into your computer's serial port.

Recorder Set Up

You will need to use Metrosoft to program the MR with the desired test settings. See the *Metrosoft Software* section for details.

Default Recorder Set Up

The MR comes factory programmed for common test conditions. All setup choices may be changed using Metrosoft (see the *Metrosoft Software* section for details).

By default, the recorder begins recording after it has detected a line-to-line voltage of 180V or greater for longer than two minutes. It then records the minimum, maximum, and RMS values on all channels using a response time of one cycle and a storage interval of one minute. The recorder will log voltage swell and sag events outside the range of 114 to 126V on lines 1 and 2 and 228 to 252V line to line. The MR4 will also log current swell events greater than 200A. By default, the MR's LED's are enabled and recording will stop when the RMS data memory is full.

The following are the MR default settings:

Recording Mode:	Current Present
Auto-Stop:	Off
Scheduled Run Start Date & Time:	1/1/97 at 07:00:00
V/I Present Start Delay:	5 minutes
Enable Recorder LED's:	Yes
Loose Neutral Threshold:	Off
Memory Mode:	Stop-when-Full
Recorder Response Time:	1 cycle
Statistics Saved:	Min, RMS, Max

Storage Interval:	00:05:00
Exceedance Only Recording:	No
Flicker Data Saved:	Yes
Histogram Data Saved:	Yes
Regulation Data Saved:	Every 10 minutes
Input Labels:	VL1, IL1, VL2, IL2, VL12, IN
Input:	All On
RMS Sag Limit:	On for VL1, VL2 and VL12; Off for IL1, IL2 and IN
RMS Sag Limit Value:	114 V for VL1 and VL2; 228 for VL12
RMS Swell Limit:	All On
RMS Swell Limit Value:	126 V for VL1 and VL2; 252 for VL12; 75A for IL1 and IL2; 200A for IN.29
Sub-Cycle Limit:	All On
Sub-Cycle Value:	100V for VL1 and VL2; 100A for IL1 and IL2
THD Limit:	On for VL1 and VL2; Off for IL1 and IL2
THD Limit Value:	10%
Memory Size:	33000

Setting the Internal Real Time Clock

Metrosoft automatically sets the internal real time clock of the MR to the current time at your computer whenever you program the MR. The MR's Real Time Clock may also be set from Remote Operation Mode. See the *Metrosoft Software* section for details.

Installing the MR

There are two different procedures for installing the MR in a ring or ringless meter socket. Follow the instructions for the type of meter socket you are connecting to.

Ringless Meter Socket Installation

1. Remove the meter box cover.
2. Remove the meter.
3. Attach the neutral clip lead if necessary (see *Connection to Neutral* later in this section).
4. Plug the MR into the meter socket.
5. Replace the meter box cover.
6. Set the record switch in the ENABLE position.
7. Plug the meter into the MR and secure using a meter ring.

Ring Meter Socket Installation

1. Remove the meter ring.
2. Remove the meter.
3. Attach the neutral clip lead if necessary (see *Connection to Neutral* later in this section).
4. Plug the MR into the meter socket and secure using a meter ring.
5. Set the record switch in the ENABLE position.
6. Plug the meter into the MR and secure using a meter ring.

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Connection to Neutral

The MR must have a connection to neutral to work properly. This can be accomplished using either the neutral clip lead or the neutral bus bar to connect to neutral inside the meter socket.

Neutral Clip Lead

A neutral clip lead is needed when connecting to a 2S, 12S or 25S meter socket without a neutral jaw.

To use the neutral clip lead:

1. Slide one end of the neutral clip lead over the spade terminal on the back of the recorder.
2. Clip the other end to neutral inside the meter socket.

Neutral Bus Bar Assembly

The neutral bus bar assembly may be used rather than the neutral clip lead on 12S and 25S meter sockets that have a neutral jaw. The neutral bus bar assembly plugs into the neutral jaw in the meter socket.

To use the neutral bus bar assembly:

1. Slide the bus bar though the hole at the left or bottom of the MR.
2. Attach the bus bar to the front of the MR using the supplied screw and install a cotter pin through the bus bar at the back of the MR.

Disconnecting/Uninstalling the MR

WARNING!

> *Follow all applicable company procedures and safety precautions for installing and removing utility meters when installing and removing the MR.*

You MUST stop recording before disconnecting/uninstalling the MR. If the LED labeled R is lit, recording is still in process. Do not disconnect the MR from a meter socket if recording is in process.

Using Metrosoft, the MR can be programmed to automatically stop recording after a selected amount of time. In addition, you can use Metrosoft to stop recording remotely (see the *Metrosoft Software* section for details).

Recording can also be stopped by toggling the RECORD switch to DISABLE,

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however, this can result in erroneous data at the end of the test, since you have to remove the meter from the MR in order to gain access to the RECORD switch. The erroneous data will have an effect on the Overall Statistics Report.

To disconnect the MR from the meter socket:

1. Remove the utility meter ring and unplug the utility meter from the MR.

2. **Set the RECORD switch to the DISABLE position.** This is important even if recording has already stopped to make sure recording doesn't accidentally start up again (i.e. when you connect the MR to AC power to retrieve data). Verify the R light on the MR goes off.

3. Remove the meter box cover (if ringless meter socket), or remove the meter ring (if ring meter socket).

4. Unplug the MR from the meter socket.

5. Disconnect the neutral clip lead, if necessary.

6. Plug the utility meter back into the meter socket.

7. Replace the meter box cover (if ringless meter socket), or replace the meter ring (if ring meter socket).

WARNING!

Failure to follow this procedure may cause loss of recorded data or unit malfunction.

Display

The MR has a 4-digit display located on its front panel. The display shows voltage values from 000.0 to 999.9 and time in minutes and seconds (MM:SS).

In the upper left and right corners of the display are indicators to show that the voltage being displayed is either line 2 or line 1 respectively.

When recording, the display alternates between the voltage on line 1 and the voltage on line 2 every 2.5 seconds.

When the MR is programmed with Voltage Present Mode, once voltage is detected, the display shows the amount of time left before the test will start. This count-down time is displayed for three seconds after the line 2 voltage is displayed.

Once the MR is properly installed, you will no longer be able to see the display (since it will be covered by the meter). If desired, you can use Metrosoft to view present input readings and other recorder information remotely (see *Remote Operation* in Chapter 5).

NOTE: *The MR's display will be blank during data retrieval.*

LEDs

The MR has 5 LED's that indicate recording status and events that have been recorded. This feature lets the service person spot problem sources at a glance, without needing to disconnect the MR or interrupt recording. It also indicates which data to review first.

The following is a list of the LEDs and what they indicate when lit:

LED	Meaning when Lit
R	Recording in Process (flashes on and off when a test is pending) (flashes on periodically when data retrieval is in process)
N	Suspected Loose Neutral Detected
S	Swell/Sag/Sub-Cycle Event(s) Detected
F	Flicker Event(s) Detected
H	Harmonic Event(s) Detected

Using Metrosoft, you can disable all of the LEDs except the recording status (since this is necessary to assure that recording has been properly started).

Turning the MR On and Off

Turning the MR On

There are two ways to turn on the Recorder:

1. Apply external power to the MR by plugging it into a live meter socket.

-or -

2. Apply external power to the MR by using the battery charger.

As soon as power is applied, the MR will turn on, and perform a quick test on the display so you can see that all elements are working properly. The display will show all eights, the colon will light, and the line 1 and line 2 indicators will light.

Within 2 seconds of turning on, the MR will begin displaying present input readings.

Turning the MR Off

Under certain conditions, the MR will turn off:

1. If the MR is not recording, and it is not connected to external power, it will automatically turn off after 2 minutes.

2. If the MR is not recording and the internal battery becomes low, it will turn itself off immediately.

3. If the MR is recording and the internal battery becomes low, it will continue recording until the end of the present response time and then turn off.

4. If the MR is recording and the line to line voltage falls below 160V for more than two minutes, it will continue recording until the end of the present response time and then turn off.

If the MR was recording when it turned off, it will automatically resume recording as soon as external power is applied. This is one of the reasons it is important to set the RECORD switch to the DISABLE position before uninstalling the MR. If the MR turned off before recording was complete, and the RECORD switch was left on ENABLE when the MR was uninstalled, later when the MR is plugged into the battery charger, it would turn back on and resume recording. See *Powering the MR* section earlier in this chapter for details on applying external power and battery shutdown.

Start and Stop Recording

Using Metrosoft, you can program the MR to start and stop recording in a variety of ways. You can also use Metrosoft to start and stop recording remotely.

The different ways to start and stop recording allow you to record data only after the MR and meter are properly installed. This helps eliminate meaningless data that can occur at the beginning or end of a test if the MR is recording while it was being installed/uninstalled.

See the *Metrosoft Software* section for details on how to set up the way the MR starts and stops recording.

Recording Modes

There are 4 recording modes to choose from to determine how the MR will **start** recording:

1. **Voltage Present Mode** - In this mode, the MR will automatically start recording when the line to line voltage has been at or above 180 V for a time greater than the specified V/I Present Start Delay. This delay gives you time to plug the meter into the MR before recording starts.

2. **Current Present Mode** - In this mode, the MR will automatically start recording when the line 1 current has been at or above 1A for a time greater than the specified V/I Present Start Delay. This mode assures that recording does not start until the meter is plugged into the MR, since no current is present until the meter is installed.

3. **Scheduled Run Mode** - In this mode, the MR will automatically start recording at a specified date and time as long as power is present. If power (at least 180 V line to line) is not present when the MR is supposed to start recording, it will start when power is restored. The Scheduled Run recording mode allows installing the MR in advance so that it starts on its own at a future date and time. This is useful for installing multiple MR's in the field so that they all start recording at the same time the following day.

4. **Manual Mode** - In this mode, recording is started and stopped using the RECORD switch on the MR. **Be aware** that when using this mode, meaningless data may occur at the beginning and end of your test when the meter is plugged into/removed from the MR.

Start Recording

1. Follow the install instructions earlier in this chapter to install the MR on the meter socket but do NOT plug the utility meter into the MR yet.

2. To **start** recording, set the RECORD switch to the ENABLE position. Recording will begin based on the recording mode programmed.

   The R (Record) LED will light to indicate that recording is in progress. If recording is pending, the R (Record) LED will flash.

   IMPORTANT: Regardless of the recording mode being used, the RECORD switch must be set to ENABLE for recording to start. For example, if the MR is set up to use Voltage Present recording mode, even when the voltage level has met the programmed requirements, the MR will NOT begin recording UNLESS the RECORD switch is set to ENABLE.

NOTE: The MR automatically uses clock hour orientation, so, recording will always start at the beginning of the next storage interval. See Clock Hour Orientation in Chapter 3 for details on this feature.

3. Complete the installation procedure (plug the utility meter into the MR). Once you do this, you will no longer be able to see the display or access the RECORD switch.

NOTE: Using Metrosoft, recording can be remotely started and stopped multiple times. This activity will show up as breaks in the test data when it's viewed in Metrosoft.

Stop Recording

To prevent recording meaningless data at the end of a test or possible loss of data, we recommend that the MR stop recording before attempting to uninstall it.

There are 2 modes that determine how the MR will **stop** recording:

1. **Auto Stop Mode** - with this mode, the MR will automatically stop recording a specified number of hours after it started recording.

2. **Memory Mode** - The memory mode can be set to Stop-When-Full or Wrap-Around. With Stop-when-Full memory mode, the MR will automatically stop recording when the RMS data memory becomes full. The Maximum Recording Time field in Metrosoft tells you how long this will take.

If you want to uninstall the MR but the R (Record) LED shows that a test is still in progress, you have the following options:

1. Wait for recording to stop before removing the MR.

2. Use Metrosoft to stop recording remotely (this requires having a computer with Metrosoft and the RS-232 cable on site). See the *Metrosoft Software* section for details. Then move the MR disable/enable record switch to the disable position.

3. Use the MR record switch to stop recording by moving it to the disable position.

IMPORTANT: The R (Record) LED will turn off when recording is complete, OR if recording stops temporarily due to power loss. If the MR has stopped recording due to power loss, it will automatically turn back and resume recording when power is restored. Since the person uninstalling the MR cannot be sure why recording stopped, the RECORD switch should always be set to DISABLE when uninstalling the MR. This will prevent the MR from resuming recording when it is later plugged in to the battery charger for data retrieval.

Remote Operation

With any recording mode, you can use Metrosoft to start and stop recording remotely. This overrides any recording mode that the MR may be programmed for. When asked to start recording remotely the MR starts recording at the beginning of the next storage interval. When asked to stop recording remotely, the MR will stop recording immediately. Once the MR stops recording the MR record switch must be put in the disable position.

The Record Switch

The primary function on the RECORD switch is to prevent accidental recording.

IMPORTANT: Regardless of the recording mode being used, the RECORD switch must be set to ENABLE for recording to start. For example, if the MR is set up to use Voltage Present Recording Mode, even when the voltage level has met the programmed requirements, the MR will NOT begin recording UNLESS the RECORD switch is set to ENABLE.

IMPORTANT: Set the RECORD switch to DISABLE before uninstalling the MR. If the MR was recording and it turned off due to loss of power, it will automatically resume recording as soon as external power is applied. If this occurs and the RECORD switch is left on ENABLE when the MR is uninstalled, later when the MR is plugged into the battery charger, it will turn back on and resume recording.

Record LED

To indicate that a test is pending, when the power is applied to the MR, the R (Record) LED will flash on and off. A test would be pending if the MR were waiting to start recording based on the recording selections programmed (i.e. voltage present, current present, scheduled run start date, V/I start delay).

During recording, the R (Record) LED stays lit. The R (Record) LED will turn off when recording stops or if the MR turns off due to power loss.

Recording Tips

Carefully follow the install instructions earlier in this chapter, to assure proper connection of the MR. **It is important to set the RECORD switch to ENABLE after the MR is connected to the meter socket, and to reset the RECORD switch to DISABLE before disconnecting the MR from the meter socket.**

To avoid recording meaningless values (such as zero currents) at the beginning of the test, we recommended programming the MR for Voltage Present, Current Present or Scheduled Run recording mode, rather than Manual recording mode. This way, recording will not start until the MR is properly installed.

When using Voltage Present or Current Present recording mode, we recommend programming the MR to use the V/I Present Start Delay feature. This gives enough time to properly install the MR and avoids recording meaningless values (such as zero currents) that can occur at the beginning of the test while the MR is being plugged into the meter socket and when the meter is being plugged into the MR.

To avoid recording meaningless values (such as zero currents) at the end of a test, we recommend programming the MR to use the Auto-Stop feature or the Stop-when-Full memory mode. This will assure that recording is complete before the MR is disconnected from the meter socket.

See the *Installing the MR* section earlier in this chapter for details on how to connect the MR. See the *Metrosoft Software* section for details on selecting the recording mode, start delay and auto stop.

Clearing Test Data

You must use Metrosoft to clear data from the MR's memory. From the Metrosoft program, go to *Remote Operation*. Use the clear button to erase unit data.

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MR SPECIFICATIONS AND ACCESSORIES

Specifications

Input Channels:

	Voltage:	L1-N, L2-N (L1-L2 Computed)
	Current:	I1, I2 (IN Computed)

Range:

	Voltage:	50-150v RMS Line to Neutral; 250v Peak Line to Neutral
	Current	5-200 A RMS/Phase; 350 A Peak;
		175 A Max Continuous w/o Damage

Frequency:	50 to 3000 Hz.
Sample Rate:	256 samples/cycle per channel (DSP Based)

Statistics Stored:

- Minimum RMS, Maximum RMS and Interval RMS for voltage and current per storage interval
- Swell and sag events with ½ cycle to 60 cycle resolution (user-selectable)
- Sub-Cycle events with 65 microsecond resolution
- THD events based on the 1st through 64th harmonic with 1 to 60 cycle resolution (user-selectable)
- Flicker events in periods from 1 second to 12 hours
- Histogram Data with 5V and 5A resolution
- Regulation Data with 10 to 30 minute resolution
- Loose neutral occurrences

Accuracy & Resolution:

Voltage Accuracy:	+ 0.35 % of Reading
Voltage Resolution:	0.1 V AC
Current Accuracy:	+ 0.35% of Reading
Current Resolution:	0.1 Amp
Real Time Clock:	0.01%

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Software:		Metrosoft ms-mrW
	Charts:	Voltage/Current with zooming, scan line etc.
	Reports:	Tabular (V/I data)
		Summary and Setup
		Out of Limits (Swell, Sag, Sub-Cycle, THD)
		Flicker
		Regulation
		Histogram (V/I)
Power:		Derived from L1-L2 Voltage
	Battery Backup:	6V, 500 mahr, sealed lead acid battery
	Run-Through Time:	2 minutes below 160V cutoff. Resume recording on power restoration.
	Data Retention:	14 days with fully charged battery. Battery charges from L1-L2 voltage.
	Min. Charging Voltage:	180V AC
Display:		4 Digit, 7 segment red LED display inside meter adapter. Display continuously scrolls VL1, VL2, Countdown Time.
Recording:		Manual (Slide switch inside meter adapter), Scheduled Run, Voltage Present, Current Present, Auto-Stop, Delayed Start
Indicating LED's:		External on side of meter adapter
	LED's marked as follows:	R (Record)
		S (Sag/Swell/Sub-Cycle)
		F (Flicker)
		L (Suspected Loose Neutral)
		H (THD)
Memory:		128 Kbytes (33,000 reading standard).
		Expandable to 1 Megabyte (500,000 Readings).
		Firmware is FLASH PROM for easy field updating
Memory Modes:		Stop-when-Full or W rap-Around
Programming/Data Retrieval:		Isolated RS232 port. Real time data can be viewed.
		Baud Rates 1200, 2400, 4800, 9600, 19200
SWC:		ANSI C37.90.1
Operating Temperature Range:		-22° to +149° F (-30 to +65C).
		Weather-tight when meter is reinstalled and sealed.

Physical:

Case:	Universal Ring/Ringless Meter.
	Adapter for Forms 2S, 12S, 25S
Weight:	3 lbs (1.4 Kg)

NOTE: *Recording times have been rounded to the nearest hour.*

Typical Recording Time

(Saving Min, RMS, Max for Channels "ON", Data for Histogram, Regulations Table and Flicker)

(2 Voltage Channels On only):

> 1 Minute-standard memory 2½ days, expanded memory 48 days
>
> 2 Minutes-standard 5½ days, expanded 96 days
>
> 5 Minutes-standard 14½ days, expanded 241 days

(2 Voltage & Current Channels On):

> 1 Minute-standard 1 ½ days, expanded 27 days
>
> 2 Minutes-standard 3¼ days, expanded 55 days
>
> 3 Minutes-standard 8 days, expanded 138 days

Specifications subject to change without notice.

Options and Accessories

Part #	Description
ca-MR	Computer Interface Cable - RS- 232 Isolated (Only 1 per computer required)
cc-MR	**Nylon Carrying Case -** Soft-sided - ps-MR and ca-MR.
ef-MR	**Fuse Kit -** Includes fuse cover
mm-MR-1	**Memory Module -** 500,000 reading (1 Meg) Memory
MR-pq	**Power Quality Option -** Captures waveforms based on time/event trigger. Requires mm-MR-1.
MR-pf	**Power Flow Option -** Records Watts, Var's, VA, Power Factor and other key power parameters.
nj-MR	**Neutral Jaw -** with screw and cotter pin
nl-MR	**Neutral Clip Lead**
MR-fc	**Unit Front Plastic Protective Safety Cover**
ps-MR	**External Power Supply/Battery Charger - c**harges MR4 from 120v
dc-MR	**Charger Cable -** to DC car cigarette lighter.

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UPGRADING FIRMWARE

You can use Metrosoft to upgrade the firmware in your MR.

You will have 3 folders under the main Metrosoft software title. Data, Setup, Firmware. The firmware folder will contain the latest firmware version at the time of your software release. You can download newer firmware versions from our web site software download page and move them to the firmware folder in the software. Always be sure to delete the old firmware files before copying new version firmware files into the firmware folder. Follow the web site firmware upgrade supplement instructions for the proper procedure.

To check a unit's firmware level select **Verify Communication** in the software. Upon communication the unit's firmware level will be reported on the computer screen.

To upgrade a unit's firmware, from the software menu bar select **FILE/FIRMWARE UPGRADE.**

The firmware upgrader can only upgrade MR4 units that are firmware version 1.6 or greater. Call tech support for information on upgrading units with a firmware version of 1.5 or lower.

Firmware file names look like:

(mr4.ini and 2087fld.191 - where 191 = the firmware version number)

The software will automatically select the **.ini file** from the Metrosoft firmware folder.

If you have moved this folder to a location other than the original default then select the **Browse** button and select the **.ini firmware file** from its location.

Then depress **Program** to start the upgrade process.

Follow all on-screen instructions as the firmware upgrade continues.

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TROUBLESHOOTING

Fuses

There are fuses for line 1 and line 2 to protect the MR. If one or both of these fuses blow during a test, the MR will no longer be powered by the meter socket but will continue recording normally under battery power. Eventually, the recorder will perform a low battery shut down to protect your test data.

To replace the fuses:

1. **Before replacing fuses: disconnect the MR from any external power source:** make sure the MR is removed from the meter socket and is not connected to the battery charger. Also, set the RECORD switch to DISABLE.

2. Each fuse has a rubber cover over it. Remove these covers by pulling them straight off.

3. Remove the old fuses by pulling them straight out.

4. Snap in new fuses.

5. Re-install the rubber fuse covers.

   You may now use the MR again.

Checking the Internal Battery

To determine the condition of the internal battery, measure the battery voltage using a voltmeter.
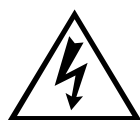
WARNING!

The battery voltage should only be measured when there is no AC power applied to the MR. Remove all connections to the MR, including the RS232 communication cable.

1. Attach the negative voltmeter lead to the neutral bus bar or neutral clip lead.

2. Raise the inside white label at the 3 o'clock position. This exposes the shield printed wiring board.

3. There is a small hole in this board with a silver circuit pad below. Insert the positive voltmeter lead into the hole, touching the silver circuit pad.

4. The voltmeter will display the voltage of the MR's internal battery.

When the MR is off and not being charged, a good battery will have a voltage of 6.2 volts or greater. If the battery charger is attached to the MR, a good battery should have a voltage of 6.9 volts or greater as the battery nears full charge. (You may read slightly different values depending on the charge in the battery and the battery temperature.)

Resetting an MR to Initial Conditions
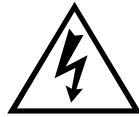
This procedure should be followed as a last resort when trouble shooting. After performing this procedure, ALL data, setup information and real time clock settings will be lost. You will have to use Metrosoft to re-program the MR to your desired operating conditions before it is ready to use.

WARNING!

> **The MR must not be powered from the AC inputs or the battery charger during this procedure. Remove all connections to the MR, including the RS232 communication cable.**

1. Raise the inside white label at the 7 o'clock position. This exposes the shield printed wiring board.

2. There are 2 holes near the edge of the board with silver circuit pads under them.

3. With a paper clip or needle nose pliers, short these 2 pads together for 10 seconds.

4. Connect the battery charger to the MR.

5. The unit will turn on in approximately 10 seconds. If the reset was successful, the display will flash 8888, then 0000, then 8888 before resuming normal operation.

6. If this does not reset the unit, repeat the process a second time. Connection to the reset pads may not have been made.

Checking the CA-MR Cable

With the computer hooked up to the ca-MR cable via the computer com port "and the ca-MR cable attached to the
lb-MR plug".

Note that the ca-MR cable box light is on, indicating the cable box battery and lb-MR plug are good.

FROM WINDOWS 95 or NT SCREEN
OPEN START MENU
      PROGRAM
      ACCESSORIES
      (For WIN 98 select the Communication Folder)
      HYPER TERMINAL
OPEN HYPERTRM.EXE
NAME = TEST
DEPRESS OK
CONNECT USING = COM2 OR 1 (whichever is your active com port)
DEPRESS OK
BITS PER SECOND = 9600
DATA BITS = 8
PARITY = NONE
STOP BITS = 1
FLOW CONTROL = Xon/Xoff
DEPRESS OK

Depress Any Keyboard Letter If you see the same letter appear on the computer screen this confirms you can communicate through this computer and your RS232 unit cable is good.

Remove the lb-MR plug from the cable and depress any keyboard letter. You will not see the same letter appear on the computer screen. This simulates a bad cable.

If this does not work;

1. Verify the correct com port has been selected for the computer you are using.

2. Verify the ca MR cable is plugged into the correct computer com port connector.

3. Try another ca MR cable. (The ca MR communication cable may be bad.

4. Note that the ca MR cable box light is on indicating the cable box battery is good and the lb MR plug is good.

5. Try another computer. (The computer may have a com port conflict problem).

SECTION II - METROSOFT SOFTWARE

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MEGGER TECHNICAL SUPPORT

In the event that Metrosoft appears defective or if you need assistance in the operation of Metrosoft, call the MEGGER SUPPORT DEPARTMENT at (610) 676-8500. The Technical Support Department will determine the necessary support to correct the problem.

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GETTING STARTED

> **NOTE:** *The instructions in this manual assume that drive C is your hard drive and drive A is your floppy drive. If you are using other drives, please substitute the correct drive letters accordingly.*

System Requirements

The following is a list of minimum hardware requirements that your computer equipment must have to install and run ms-mrW Metrosoft:

Operating System:	Windows 95/98 or Windows NT 4.0
Computer:	IBM PC or compatible computer
Processor:	Pentium 90MHZ Processor minimum
Memory:	32 MB RAM
Hard Disk Space:	125MB of free disk space, (up to 5MB for program disk space, 120 MB free after installation)

3½" high-density floppy disk drive or CD-Rom

Asynchronous communications port (for communications between the Recorder and the computer).

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Installing Metrosoft

Follow all instructions included with your Metrosoft Software.

By default, Metrosoft will automatically be installed to a directory on your hard drive called:

C:\PROGRAM FILES\MSMRWIN

All program files necessary for running Metrosoft are in that directory.

Metrosoft also creates subdirectories for keeping data files and Recorder setup files separate from the program files.

These subdirectories are called:

C:\PROGRAM FILES\MSMRWIN\DATA

and

C:\PROGRAM FILES\MSMRWIN\SETUP

By default, Metrosoft is configured to use these directories. If you create your own or additional subdirectories you can change the defaults to your directory names from the Metrosoft Setup Menu.

Metrosoft Main Window
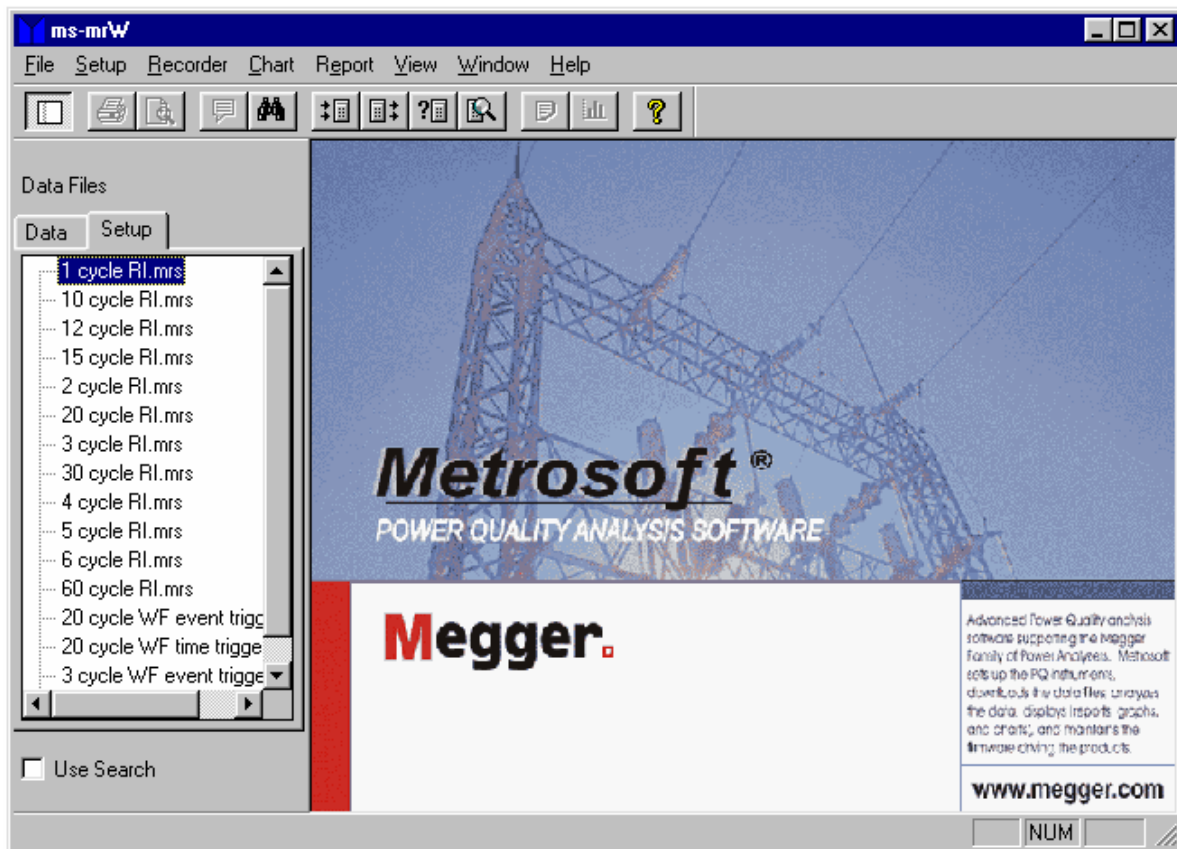
The Metrosoft Main Window (shown above) is displayed when the application is launched from Microsoft Windows 95, 98, ME, 2000, XP or NT 4.0. This window follows the Microsoft Multiple Document Interface (MDI) specification. This means there may be child windows that can be tiled, maximized, sized, and minimized to an iconic state within the Metrosoft Main Window.

File Menu – Contains commands related to data file operations. See *Edit File Information, Importing Data Files, File Information* and *Searching For and Retrieving Stored Test Data.*

Setup Menu – Contains commands for configuring Metrosoft. See *Communication Setup, Directory Setup* and *Line Frequency Setup.*

Recorder Menu – Contains commands for interacting with a Megger recorder. See *Programming the Recorder, Get and View Test Data From the Recorder, Remote Operation* and *Verify Communication with the Recorder.*

Chart Menu – Contains commands for creating a Chart and performing Harmonic Analysis. See *Charts* and *Harmonic Analysis.*

Report Menu – Contains commands for creating a Report. See *Report Generation.*

View Menu – Contains commands for showing or hiding toolbars and the Side Bar.

Window Menu – Contains commands for arranging open windows and selecting the current window.

Help Menu – Contains a command to show this help file.

About Metrosoft

This dialog is accessed through the Help - About menu item. It displays the product name and the version number of the software. This information is especially useful for technical support staff.

```
About Metrosoft                                     ✕

                         M

              Metrosoft ms-mrW Version 3.1.2.0

              Copyright © Megger Inc. 2003


                        OK
```

Metrosoft configuration information is contained in the initialization file msmrwin.ini. This includes Metrosoft setup, chart setup, and report setup information. This information will be saved to the msmrwin.ini file each time Metrosoft is shut down as long as the *Save on Exit* item in the *Setup Menu* is checked.

A sample set of data (sample.mrd) is included with Metrosoft. You are free to examine this data set to familiarize yourself with the charting and reporting features.

Communication Setup

To setup your communications port, do one of the following from the Metrosoft Main Window.

Mouse: Click on **Setup** in the menu bar. Then, from the pull down menu, click on **Communication**.

Keyboard: Choose the *Setup/Communication* option from the menu bar by pressing (Alt+S,C).

This will take you to the *Communication Parameters* dialog. Use this dialog to specify:
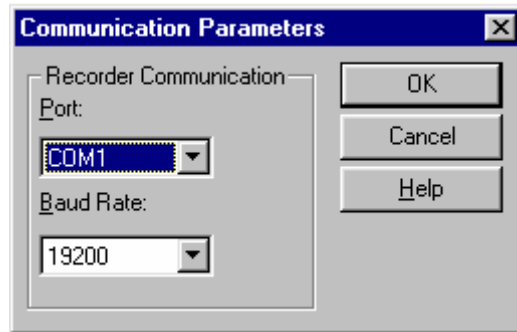
Communications Port – select which serial port, commonly COM1 or COM2 - that the Software will use to communicate with a Recorder.

Baud Rate – select which Baud Rate the software will initially attempt to use to communicate with the Recorder.

Directory Setup

To set Metrosoft to the desired setup and data directories, do one of the following from the Metrosoft Main Window:

Mouse: Click on **Setup** in the menu bar. Then from the pull down menu, click on **Directory**.

Keyboard: Choose the *Setup/Directories* option from the menu bar by pressing (Alt+S,D).

This will take you to the File Directories dialog. From here the setup and data directories may be configured.
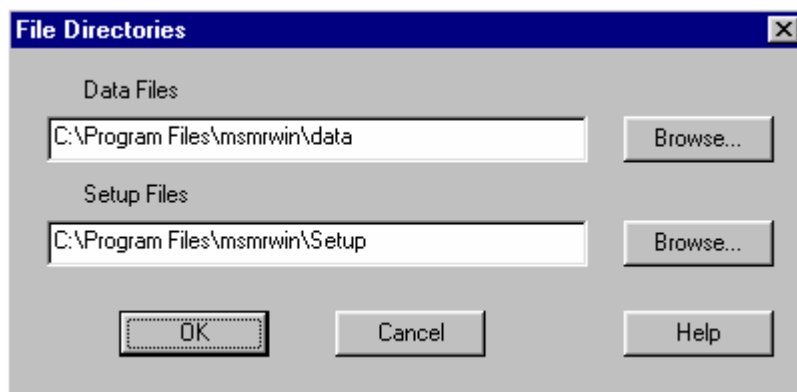
To Specify the Location Metrosoft will use to look for Data Files:

1. Click on the **Browse** button, next to the "Data File Locations" field.
2. Navigate to the location of the directory you wish to use, then click **OK** to return to the previous screen.
3. Click the **OK** button to save the new Data File Path.

To Specify the Location Metrosoft will use to look for Setup Files:

1. Click on the **Browse** button, next to the "Setup File Locations" field.
2. Navigate to the location of the directory you wish to use, then click **OK** to return to the previous screen.
3. Click the **OK** button to save the new Setup File Path.

Verify Communication with the Recorder

Whenever you will be communicating with the recorder through Metrosoft, we recommend you verify that the computer is hooked up and communicating properly. Communication with the recorder is required for programming, retrieving stored test results, and remote operation.

Follow these steps to verify communication:

Step 1:

Check to make sure that Metrosoft is configured for the correct communications port (COM1 – COM9) and the desired baud rate. Metrosoft will change the recorder's baud rate to match the baud rate of the computer.

Step 2:

Do one of the following from the Metrosoft Main Window:

Mouse: Click on **Recorder** in the menu bar. Then from the pull down menu click on **Verify**.

Keyboard: Choose the *Recorder/Verify* option from the menu bar by pressing (Alt+R,V).

The following dialog will appear:
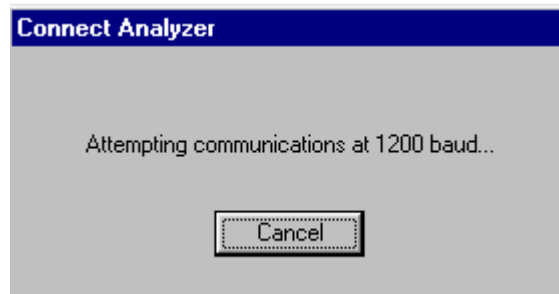
Step 3:

Connect the RS-232 cable to the 5-pin connector on the recorder and connect the other end to the computer's serial port.

Press **OK**. If communication is established the following dialog will appear on your computer screen.

Upon communication verification, Metrosoft will also display your unit's firmware level.

If Metrosoft fails to communicate with the recorder, the following dialog will appear on the screen:
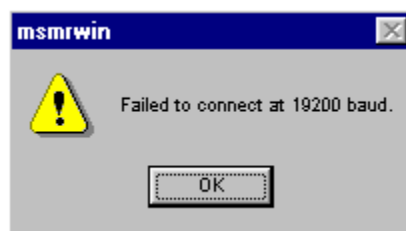
If you get this message, check each of the items on the list and try communicating again.

Programming the Recorder

The MR4 comes to you factory programmed for common test conditions. You will need to use Metrosoft to set the real time clock and to create your own custom settings for collecting data.

You set up and save Recorder Setup Files, which can be retrieved for programming multiple units. Recorder Setup Files can be created within seconds. Metrosoft uses fill-in-the-form programming. This means that all you have to do is "fill in a form" by choosing the settings you want for a given test. The information is then sent to the MR4 and the test is run.

When you program the MR4, it remembers the settings, even when it is turned off. You do not need to reprogram the MR4 unless you want to change the settings, or its internal battery has completely discharged, causing the MR4 to lose its memory.

To program the recorder:

Mouse: Click on **Recorder** in the menu bar. Then from the pull down menu, click on **Program**.

Keyboard: Choose the *Recorder/Program* option from the menu bar by pressing (Alt+R,P).

Select the setup category for which you want to make changes. For information on the setup categories, see *Programming The Recorder (General), Programming The Recorder (RMS), Programming The Recorder (Recording), Programming The Recorder (Loose Neutral), Programming The Recorder (Flicker)*, and *Programming The Recorder (Waveform)*.

When you are finished with the setup, see *Sending A Setup File To The Recorder* to program the recorder.

Programming the Recorder (General)

This window contains settings common to all types of setups.
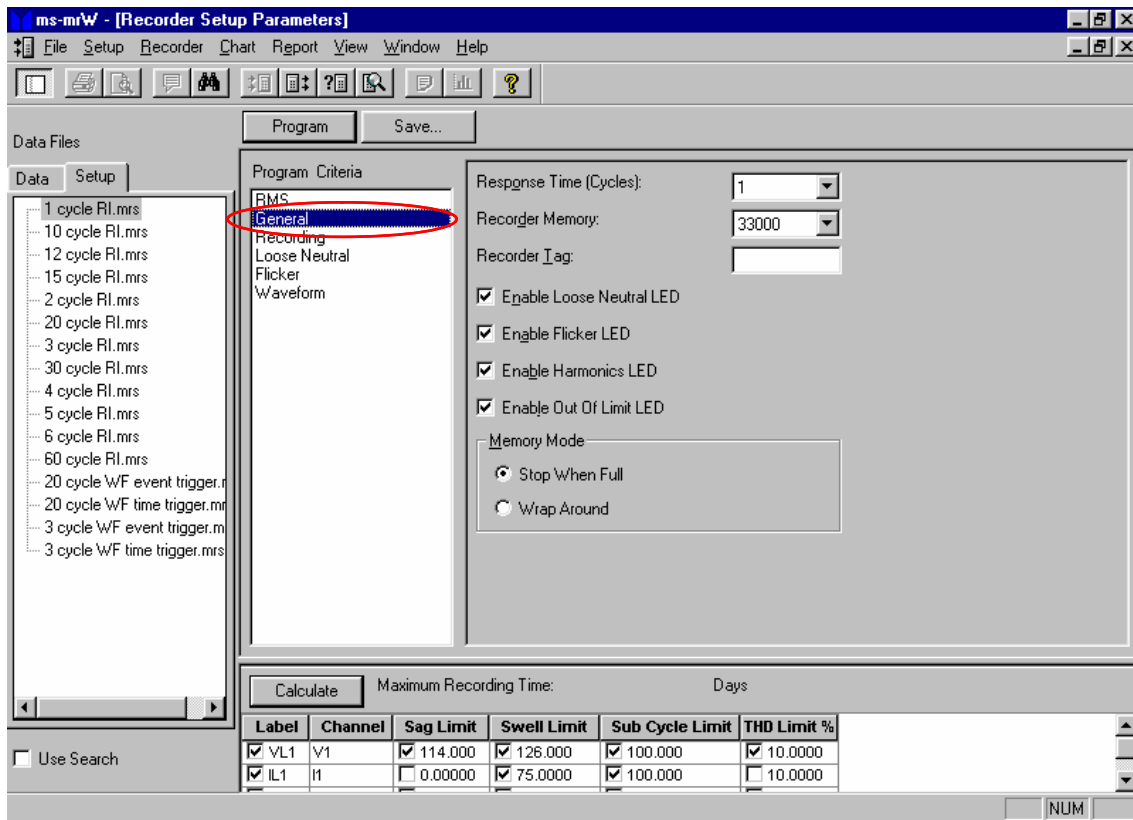
Response Time (Cycles)

Determines how many cycles will be used to calculate RMS voltage and current values.

Recorder Memory

Used to indicate the amount of memory in your recorder so that Maximum Recording Time can be calculated.

Recorder Tag

Allows you to enter information to identify the recorder or the test site. This information appears in reports and charts.

Enable Recorder LEDs

The checkboxes can be used to enable or disable recorder LEDs that indicate Loose Neutral, Flicker, Harmonics, or Out Of Limit events. The Recording Status LED is always active.

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Memory Mode

This affects how the recorder responds to a memory full condition. The choices are:

Stop-When-Full: Recording stops when the memory becomes full of data.

Wrap-Around: Recording wraps to the beginning of memory when full, overwriting the oldest data.

Programming The Recorder (RMS)

This window contains settings related to RMS and Demand recording.
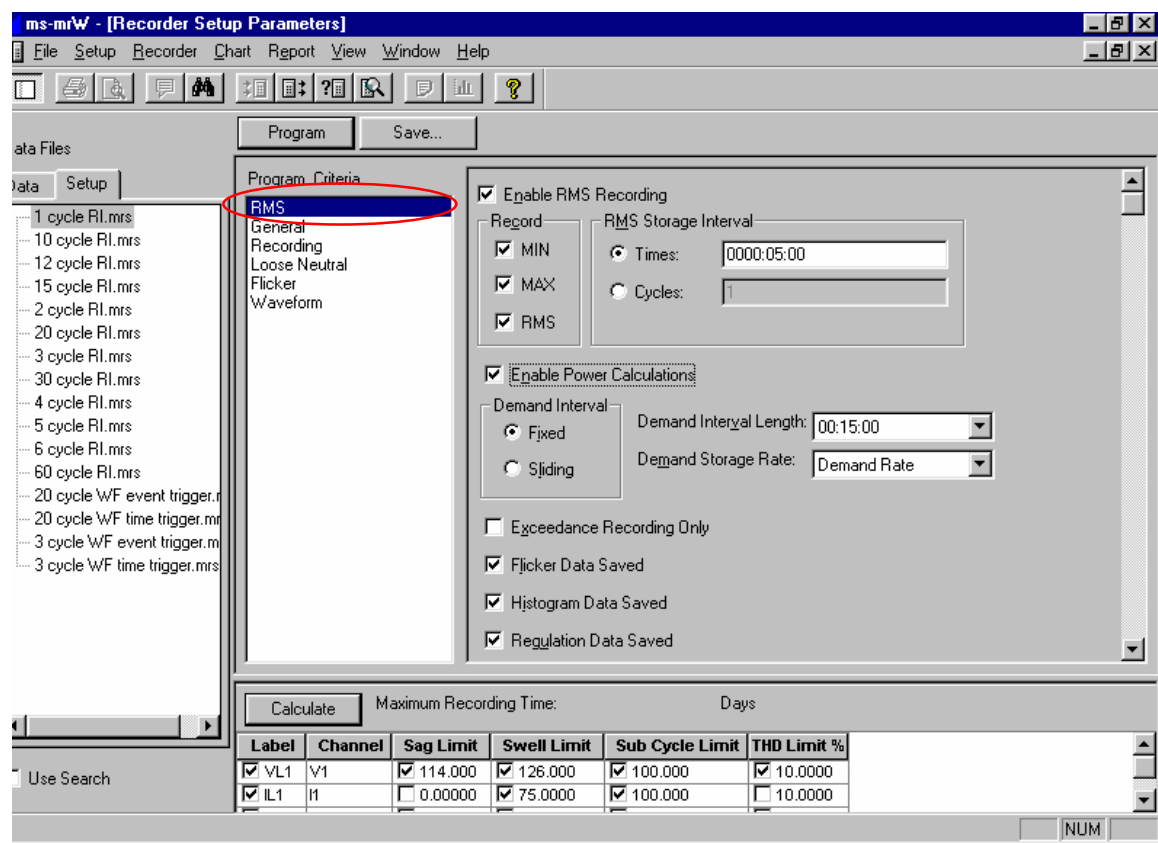
Enable RMS Recording

This checkbox must be checked to record RMS data.

Record

Use the checkboxes to enable/disable recording Minimum, Maximum, and RMS values. Accessible only if RMS Recording is enabled.

RMS Storage Interval

Determines how often the recorder will store RMS data values in memory. The value can be expressed in clock time or cycles. This value is used to calculate the Maximum Recording Time. Accessible only if RMS Recording is enabled.

Enable Power Calculations

This checkbox must be checked to record Demand data.

Demand Interval

Choose from a *Fixed* or *Sliding* demand interval. Accessible only if Demand Recording is enabled.

Demand Interval Length

The interval at which Demand values are calculated. Accessible only if Demand Recording is enabled.

Demand Storage Rate

The interval at which Demand data is recorded. The *Demand Rate* choice results in a storage rate equal to the interval length.

Exceedance Recording Only

If checked, the MR4 will record data only when one or more inputs are out of limits.

Flicker Data Saved

Determines whether or not Flicker events will be recorded.

Histogram Data Saved

Determines whether or not Histogram data will be saved.

Regulation Data Saved

Determines whether or not Regulation data will be saved.

Length

Allows selection of a time interval for saving Regulation data. Accessible only if Regulation Data Saved is enabled.

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Programming The Recorder (Recording)

This window contains settings related to starting and stopping recording.
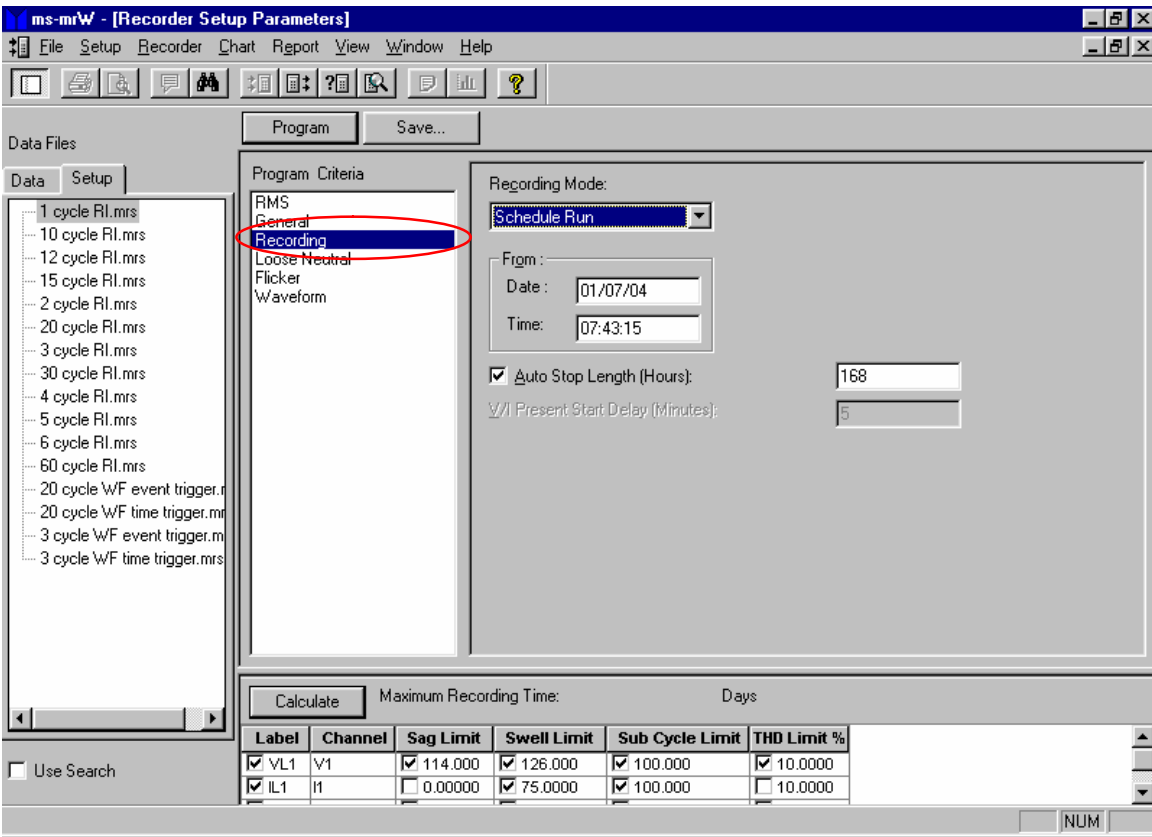
Recording Mode

Determines when the MR4 will start recording. There are four recording modes to choose from:

Voltage Present	Recording starts when the line-to-line voltage has been at or above 180V for a selected amount of time.
Current Present	Recording starts when the line 1 current has been at or above 1A for a selected amount of time.
Manual Mode	Recording starts and stops using the RECORD switch on the MR4, or the Remote Operation window in Metrosoft.
Schedule Run	Recording starts at a preselected date and time.

From

Allows you to select a **date and time** at which to start recording. Accessible only if Schedule Run is the selected recording mode.

Auto Stop Length (Hours)

If selected, allows programming the MR4 to automatically stop after a selected number of hours.

V/I Present Start Delay (Minutes)

Determines the amount of time that voltage or current must be present before the MR4 begins recording. Accessible only if Voltage Present or Current Present recording mode is selected.

Programming The Recorder (Loose Neutral)

This window contains settings related to recording Loose Neutral events.

Enable Loose Neutral

Determines whether or not Loose Neutral events will be recorded.

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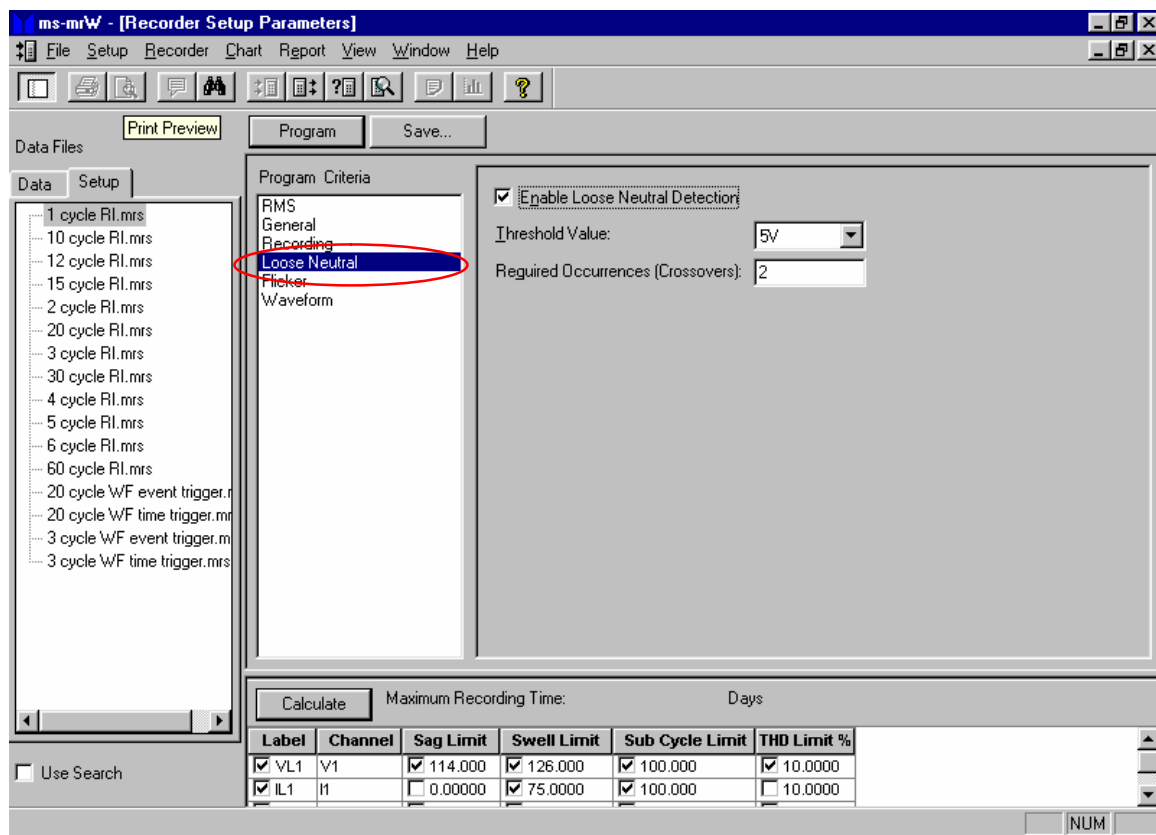
Threshold Value

> Determines the threshold for detecting a Loose Neutral event. Accessible only if Loose Neutral recording is enabled.

Required Occurrences

> Determines the minimum number of Loose Neutral occurrences for recording a Loose Neutral event. Accessible only if Loose Neutral recording is enabled.

Programming The Recorder (Flicker)

> This window contains settings related to Flicker event recording.
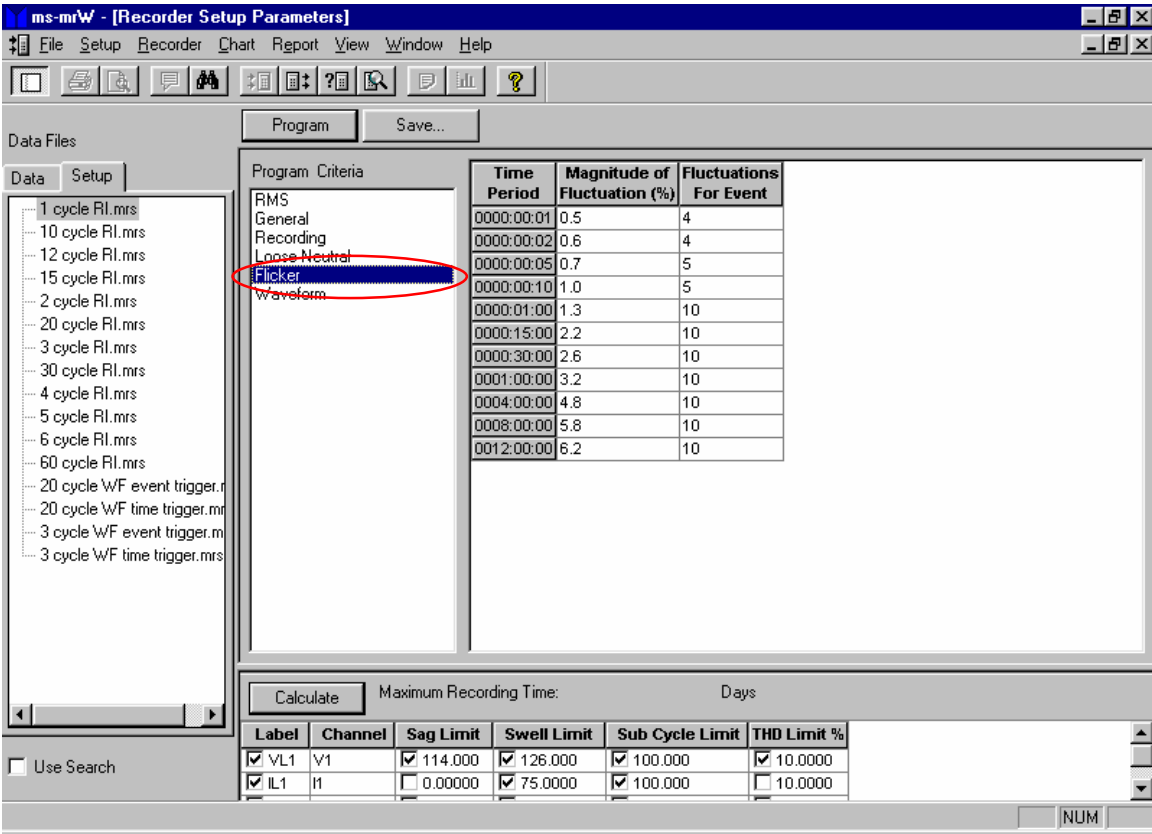
> By default the MR4 detects Flicker based on the GE Flicker Curve. If you want to set up criteria other than this to detect flicker, you can edit the values in the table shown on this setup page.

Programming The Recorder (Waveform)

This window contains settings related to Waveform recording.
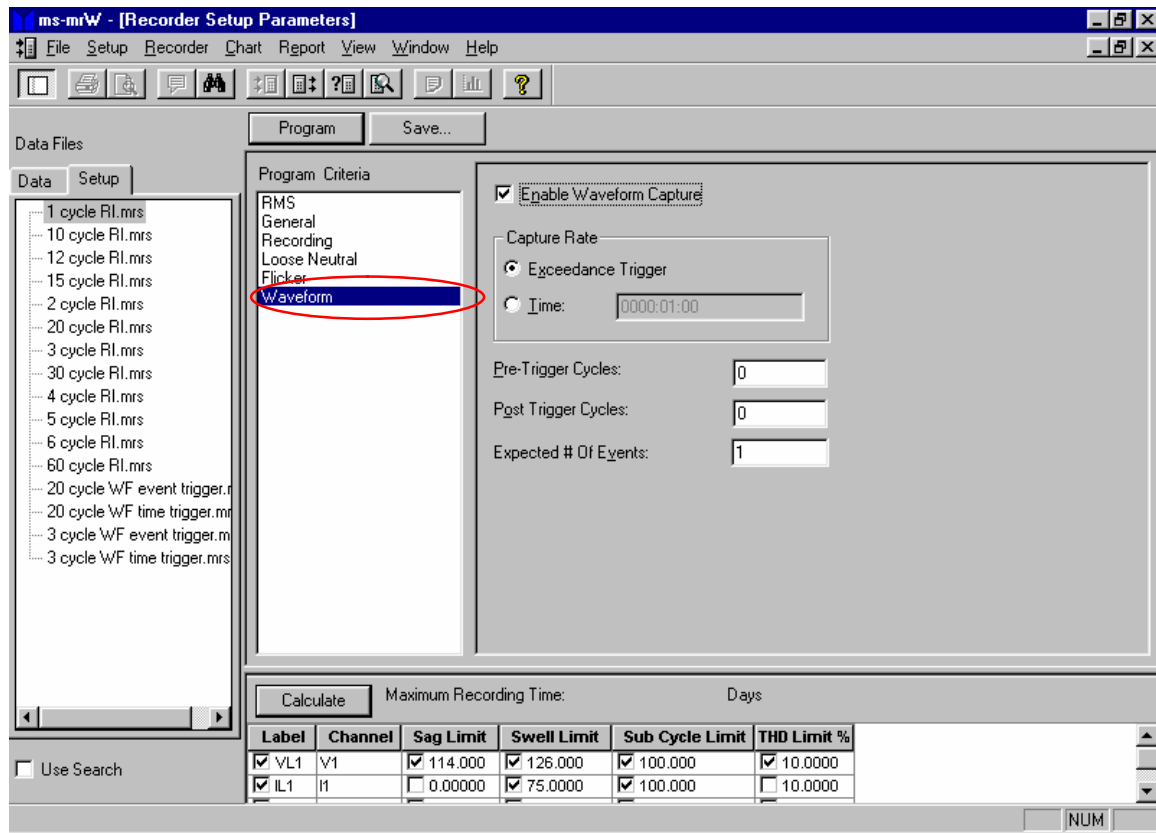
Enable Waveform Capture

Determines whether or not waveform data is recorded. Waveform Capture must be enabled in order to perform Harmonic Analysis.

Capture Rate

There are two choices for this parameter:

Exceedance Trigger - Waveform Capture will only occur when input readings are outside selected limit values (see *Input Limits*). Accessible only if Waveform Capture is enabled.

Time - The frequency at which the recorder will capture waveforms. Accessible only if Waveform Capture is enabled.

Pre-Trigger Cycles

The number of cycles to record before a Waveform Capture event.

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Post-Trigger Cycles

The number of cycles to record after a Waveform Capture event.

Expected # of Events

If waveform capture is set to exceedance mode, the number of waveforms captured will depend on how many times the inputs to the unit exceed their programmed limits. So the user can program in the expected number of events, then press the **calculate** button in the software. This will show the user how long the unit will record for that number of waveform captures to occur. (This is only an estimate due to the fact that it was calculated on expected number of events.) This does not affect the units programming at all; it is just a tool so the user can estimate how long the unit will record for.

Input Limits and Maximum Recording Time

Input Limits
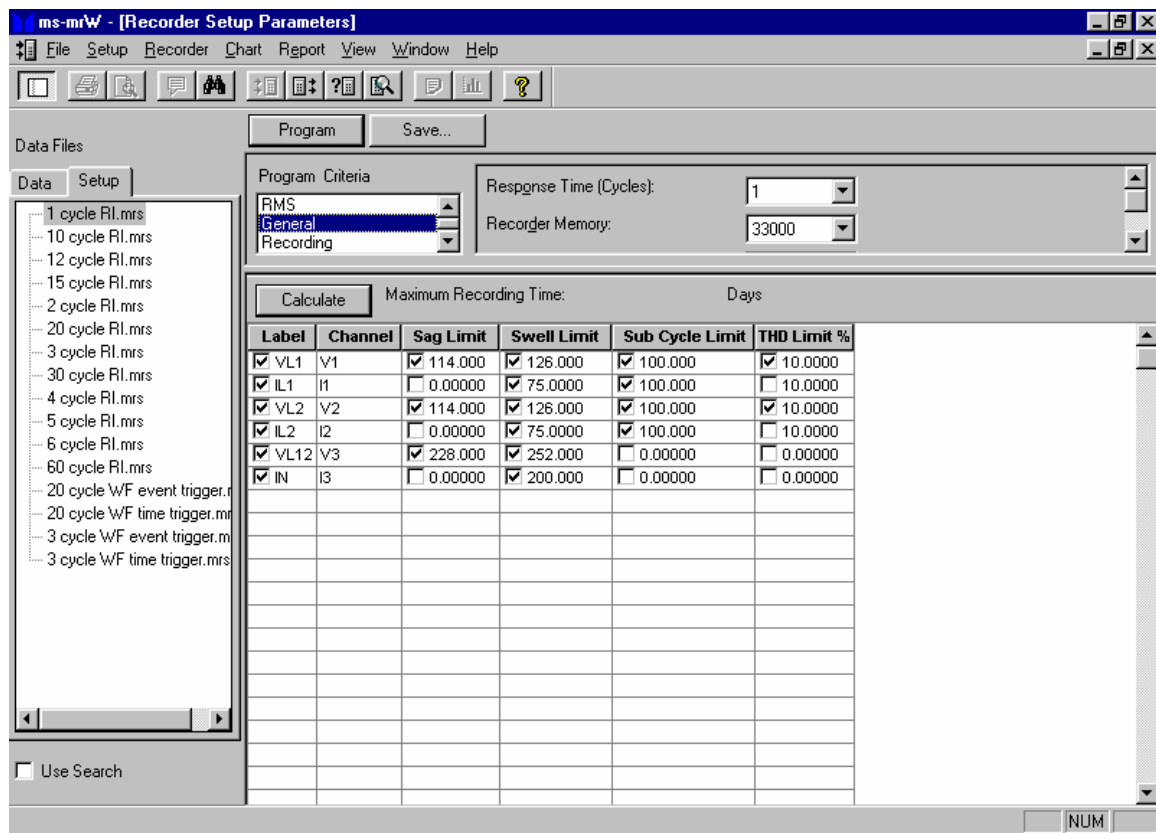
Label: This column allows the user to turn on and off individual channels. It also allows the user to rename the channel. If a channel is checked then it will record data. If a channel is not

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checked then it will not record data. To rename a channel just highlight the label and type in the new name.

Channel: This column let's the user know what channel each row is related to. This column is not user adjustable.

Lower Limit: This column allows the user to turn on and off and set the lower limit of each channel. Check the limit box and input a low limit value. If the measured RMS value goes below this setting, an out of limits event will occur. This event can be viewed in the out of limits report.

Upper Limit: This column allows the user to turn on and off and set the upper limit of each channel. Check the limit box and input an upper limit value. If the measured RMS value goes above this setting, an out of limits event will occur. This event can be viewed in the out of limits report.

Sub-Cycle Limit: This allows the user to program the unit to capture events that last less then 1 cycle (sub-cycle events). In order for this option to be active, the lower and upper limits must be checked for each channel the user wants to capture sub-cycle events on and a sub-cycle limit value must be input. The unit will then compare each sample of each cycle to the corresponding sample of the previous cycle. If the difference is greater than the limit programmed in the setup file then an out of limits event occurs. This event can be viewed in the out of limits report.

THD Limit: If this is checked and a limit is set it will allow the unit to record Total Harmonic Distortion events. Total Harmonic Distortion (THD) is defined as the ratio of the magnitude of the Harmonics compared to the magnitude of the fundamental, expressed as a percentage. The MR4 has the ability to trigger out of limit events based on THD exceedances. The user can program a percentage THD level into the setup file. The unit will then compare the percentage THD measured versus the user defined limit. If the percentage THD is greater than the value programmed by the user, then an out of limit THD event occurs. The unit calculates THD once every response interval. Therefore, if the response interval is set to 1 cycle, THD will also be calculated every cycle. However, this means that sub-cycle events could inadvertently trigger THD events. Total Harmonic Distortion is not an instantaneous value. It is normally performed over several cycles. Therefore, it is recommended that whenever THD limits are enabled the

response interval of the unit should be set to 6 cycles minimum. If the response interval is set to less than 6 cycles and the THD trigger is enabled, then some THD events may be recorded due to sub-cycle deviations. This can be misleading and prematurely fill the out of limit memory of the unit. Therefore THD triggers, in the setup file should be disabled or (un-checked) unless the response interval is set to 6 cycles or higher.

Maximum Recording Time

Maximum Recording Time is also shown in this pane, based on recorder memory size, number of inputs, sampling rate, etc. To recalculate the Maximum Recording Time, press **CALCULATE**.

Sending A Setup File To The Recorder

There are two ways to program the recorder from Metrosoft. You can create a recorder setup file and immediately send it to the recorder or you can retrieve a previously saved recorder setup file.

Real Time Clock

Metrosoft automatically sets the real time clock (RTC) of the recorder to the current time at your computer when a setup file is sent to the recorder. Make sure that your computer's clock has been set to the correct time before using Metrosoft to program the recorder. See the Windows manual that came with your computer for assistance on setting the computer's clock. The real time clock can also be reset using the remote operation feature.

Retrieving A Recorder Setup File

Simply click on the setup file tab on the Side Bar and double-click on the desired file. Multiple setup file windows may be displayed at one time.

Sending A Setup File To The Recorder

Note: *You must clear all data from the recorder's memory before you can program it for a new test. If data is in the recorder, you will be asked if you wish to clear it when attempting to program.*

1. Fill in the recorder setup form as desired (or retrieve a previously saved file).

2. Connect the recorder to the computer's serial port using the RS-232 cable.

3. Click on **PROGRAM** in the recorder setup form. Once programming is complete, the following message will appear on your screen:

Note: *We recommend that you verify communication between the recorder and the computer before sending the setup file.*
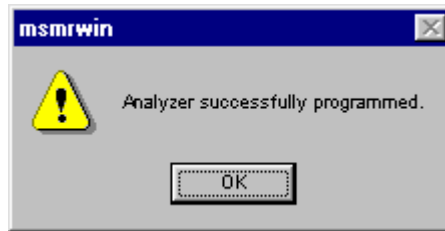
Saving Recorder Setup Files

After filling in the Recorder Setup Form, you may save the setup to disk for future use. The files created are called Recorder Setup Files. This allows you to recall a specific test setup and quickly program additional recorders in the same way. Valuable time is saved because you do not have to remember the settings or recreate them every time you need to program the recorder. You may save as many setup files as disk space permits.

To save a Recorder Setup File:

1. Fill in the *Recorder Setup* Form

2. Click on the **Save** button and the following dialog box will appear.
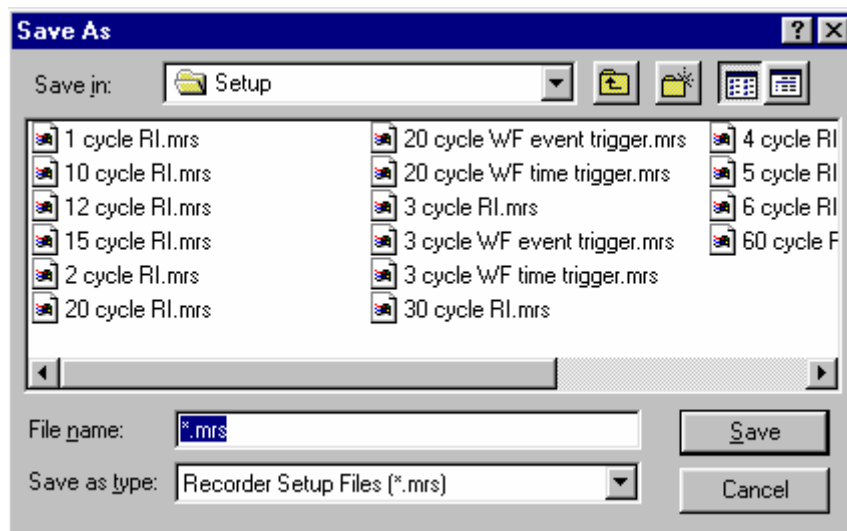
Long filenames are supported. After the Setup File has been saved, it will appear on the Side Bar.

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GET AND VIEW TEST DATA FROM THE RECORDER

You can transfer the data from the recorder to your computer where you can use Metrosoft to analyze the test results and create hard copy charts and reports.

To get data from the recorder:

Mouse: Click on **Recorder** in the menu bar. Then from the pull down menu, click on **Retrieve**.

Keyboard: Choose the *Recorder/Retrieve* option from the menu bar by pressing (Alt+R,R).

The following test identification form will appear:

1. Enter information into any of the test identification fields as needed. The information you enter will be assigned to the test data file and may later be used when searching for specific data files. The filename field must be filled-in for data to be retrieved. Click on **Browse** next to the "File Name" field in order to do this. Filling in all other fields is optional. Metrosoft supports long filenames.

2. Connect the recorder to the computer's serial port using the RS-232 cable.

3. Click on **OK** to retrieve data. The recorder will automatically turn on and as the data is transferred, Metrosoft will display the progress of data being transferred and perform a checksum on each packet of data to ensure proper transmission. If desired, press the cancel button to abort data retrieval in progress.

When data retrieval is complete, the following message will be displayed:
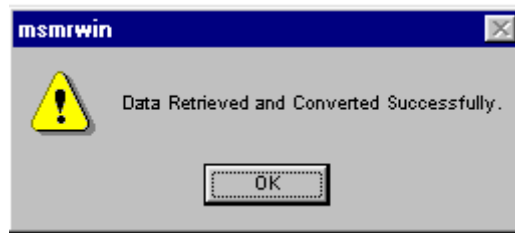
The following should be noted:

▪ A complete data transfer may take several minutes, depending upon the length of the test and the speed of your computer, and the baud of your communications port.

▪ The data is saved in the form of a binary data file, which Metrosoft interprets to create reports and charts.

▪ If the recorder fails to respond to the computer's inquiry within a short time, a help window appears. See *Verify Communications* if communication cannot be established.

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REMOTE OPERATION

Metrosoft allows you to use your computer to check the status of the recorder, view the data in real time, clear the test results, start and stop recording sessions, and reset the recorder's real time clock. This is especially useful if the recorder is located in a place that is not easily accessible.

To remotely operate the recorder:

1. Connect the recorder to the computer with the RS-232 cable.

2. **Mouse:** Click on **Recorder** in the menu bar. Then from the pull down menu, click on **Remote** – or –

    Keyboard: Choose the *Recorder/Remote* option from the menu bar by pressing (Alt+R,E).

The following remote operation window will appear:
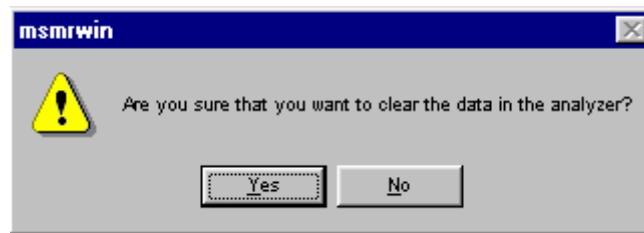
See the following related topics:

Clearing Test Results At The Recorder

Start And Stop Recording

Clearing Test Results at the Recorder (Remote Operation)

To clear data using Metrosoft;

Press the **Clear** button from the Remote Operation Window. The following question will appear:

This is to prevent you from accidentally clearing test results.

Click **OK** to clear data, otherwise click *Cancel*. The following screen will appear to indicate that data has been cleared.

## *Start And Stop Recording (Remote Operation)*

To start recording at the recorder from your computer:

Press the **Start** button from the Remote Operation Window; data recording will start.

Once recording has been activated, you may exit the Remote Operation Window and perform other Metrosoft functions without affecting the recording session. You may even exit Metrosoft and disconnect the recorder from the computer without interrupting the recording session.

To stop recording at the recorder from your computer:

Press the **Stop** button from the Remote Operation Window, the following message will appear on your screen:
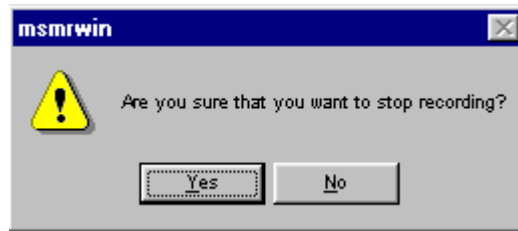
The recorder will continue to display current readings even though recording has been stopped.

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SEARCHING FOR AND RETRIEVING STORED TEST DATA

Once you have transferred data from the recorder to Metrosoft, you can retrieve these data files and begin your analysis.
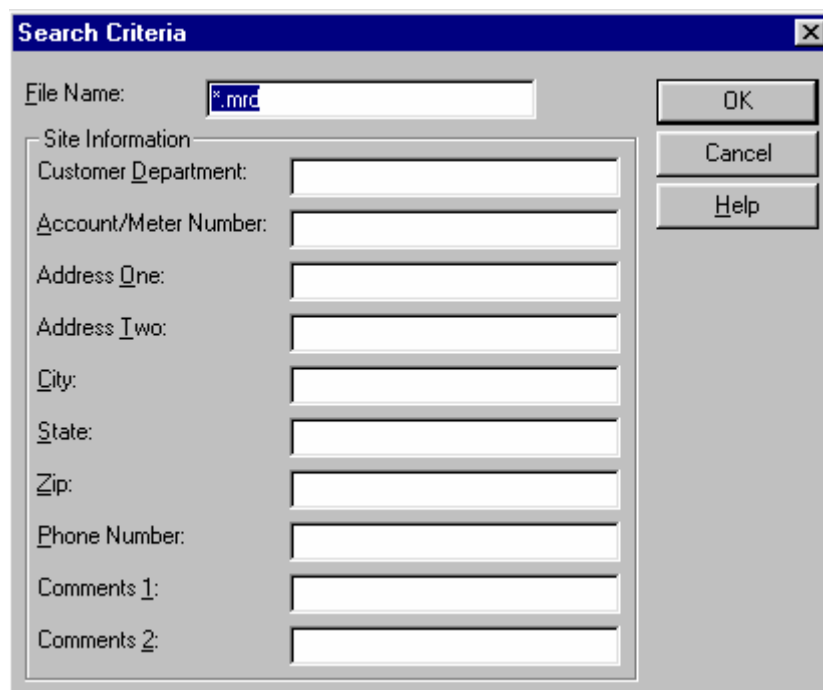
Searching For Data Files

Metrosoft lets you list all data files on the drive, or you can tell Metrosoft to search for specific files according to a set of search criteria you specify. Metrosoft's ability to perform database searching is a great time saving feature, since only the files you are interested in will be listed.

When the data was transferred from the recorder to the computer, you entered information into test identification fields. You may perform a search based on the information you entered into any or all of the fields that appear in the example below.

To bring up the Search Criteria dialog box, choose the *Search Criteria* item from the File Menu.

To ensure your search criteria are being used by the Side Bar, make sure the *Use Search* checkbox that appears at the bottom of the side bar is checked.

To display all data files in your data directory, disable filtering by Search Criteria by unchecking the *Use Search* checkbox that appears at the bottom of the side bar.

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You only need to fill in the fields that are necessary to distinguish the data files you are interested in, all other fields may be left blank. Searches are not case sensitive, thus it does not matter whether you use upper or lower case letters when filling in the search criteria form.

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CHARTS

### *To Create a Chart using Metrosoft:*

Select the data file containing the data you wish to chart using the Side Bar.

Bring up the Metrosoft Chart Window:

Mouse: Click on **Chart** in the menu bar. Then from the pull down menu, click on **Create**.

Keyboard: Choose the *Chart/Create* option from the menu bar by pressing (Alt+C,C).

A Metrosoft Chart Window will appear, like the one pictured below.
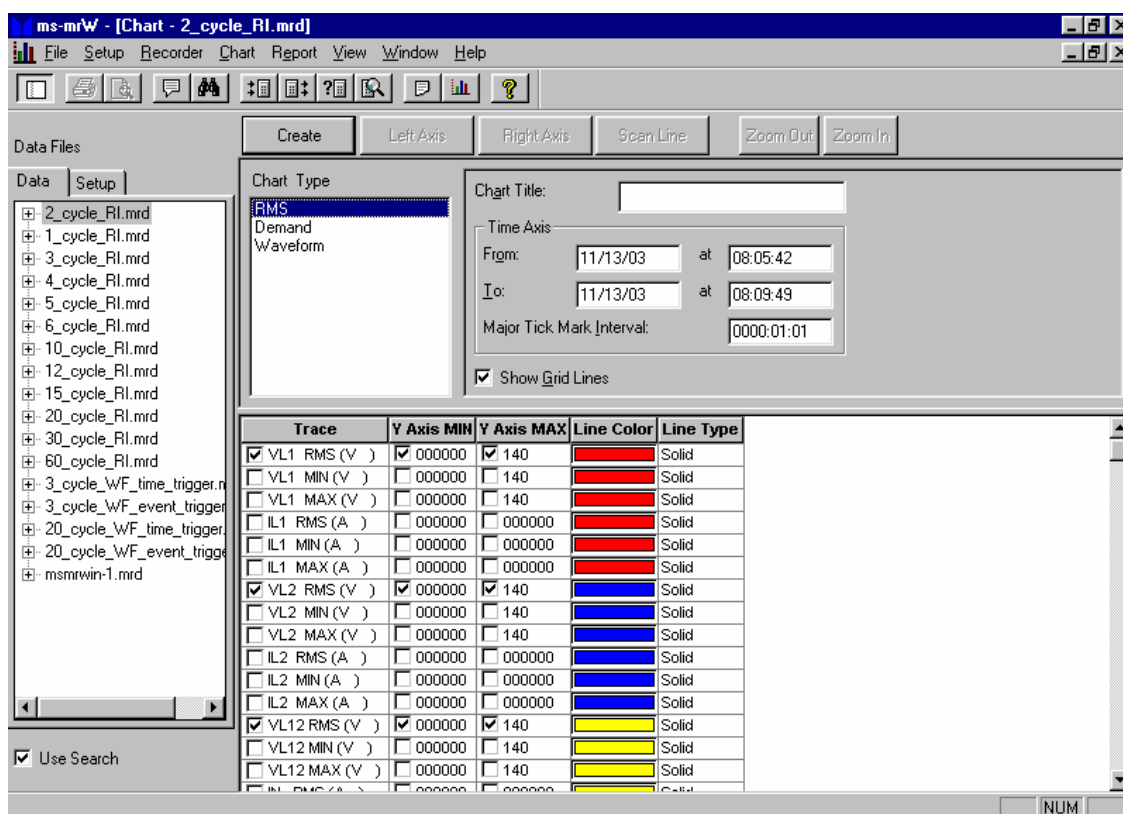
Depending on what data is present in the selected data file, the available types of charts to create will be listed in the left-most list box of the Chart Window.

Select the type of chart you wish to create simply by clicking on it in the left-most list box. Further options for configuring the type of chart you selected will appear. For information on configuring each chart type, see *RMS Chart Setup, Demand Chart Setup*, and *Waveform Chart Setup*.

After you have configured your chart, click the **Create** button in the upper left corner of the Chart Window. Your chart will appear.

To change the configuration of your Chart, click the **Setup** button in the upper left corner of the Chart Window.

RMS Chart Setup

To Create an RMS Chart, perform the following steps:

1. Bring up a Metrosoft Chart Window for the selected data file (see *Charts*).
2. Make sure *RMS* is the chart type selected in the left most list box of the Metrosoft Chart Window.
3. Optionally fill in the Chart Title, the From and To Times, and the Show Grid Lines controls in the panel to the right of the list box.
4. Select which of the available traces you wish to chart. The lower panel of the Metrosoft Chart Window displays a grid containing each reading that is available to display.
5. To enable a trace (make it show up in the chart) check the checkbox to the left of the trace name.

Optional – set the lower and upper limits of the Y Axis for each trace by:

1. Enabling the limit by checking the checkbox to the left of the limit reading.
2. Typing in a limit value.

Trace Color – set a trace's color in the chart by clicking on the trace color rectangle for that trace. A list box containing the available colors for the trace will appear. Click on the desired trace color to close the list box.

Click the **Create** button on the upper left of the Metrosoft Chart Window. The Metrosoft Chart Window will then display your chart.

To Change the setup of your chart once it is created, simply click the **Setup** button in the upper left corner of the Metrosoft Chart Window. The view will return to the Chart Setup view.

Sample RMS Chart:

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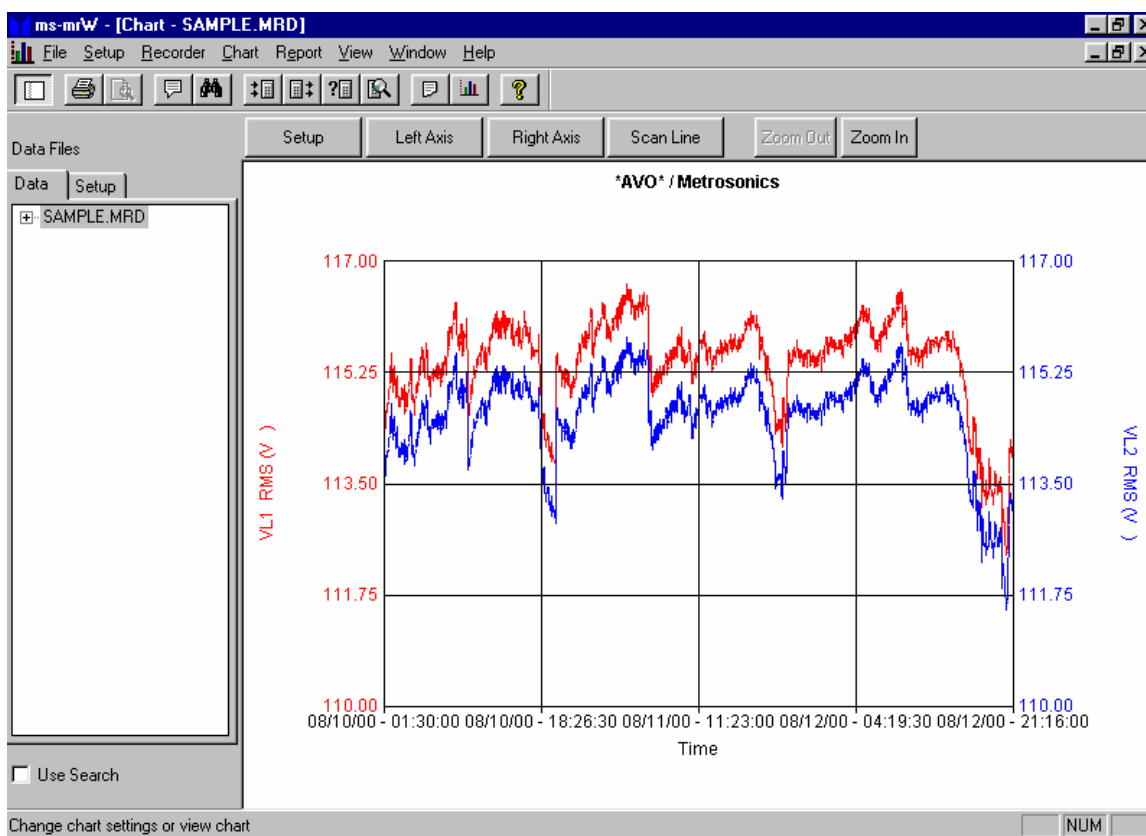
Demand Chart Setup

To Create a Demand Chart, perform the following steps:

1. Bring up a Metrosoft Chart Window for the selected data file (See *Charts*).

2. Make sure *Demand* is the chart type selected in the left most list box of the Metrosoft Chart Window.

3. Optionally fill in the Chart Title, the From and To Times, and the Show Grid Lines controls in the panel to the right of the list box.

4. Select which of the available traces you wish to chart. The lower panel of the Metrosoft Chart Window displays a grid containing each reading that is available to display.

5. To enable a trace (make it show up in the chart) check the checkbox to the left of the trace name.

Optional - set the lower and upper limits of the Y Axis for each trace by:

1. Enabling the limit by checking the checkbox to the left of the limit reading.

2. Typing in a limit value.

   Trace Color – set a trace's color in the chart by clicking on the trace color rectangle for that trace. A list box containing the available colors for the trace will appear. Click on the desired trace color to close the list box.

   Click the **Create** button on the upper left of the Metrosoft Chart Window. The Metrosoft Chart Window will then display your chart.

   To change the setup of your chart once it is created, simply click the **Setup** button in the upper left corner of the Metrosoft Chart Window. The view will return to the Chart Setup view.

Sample Demand Chart:
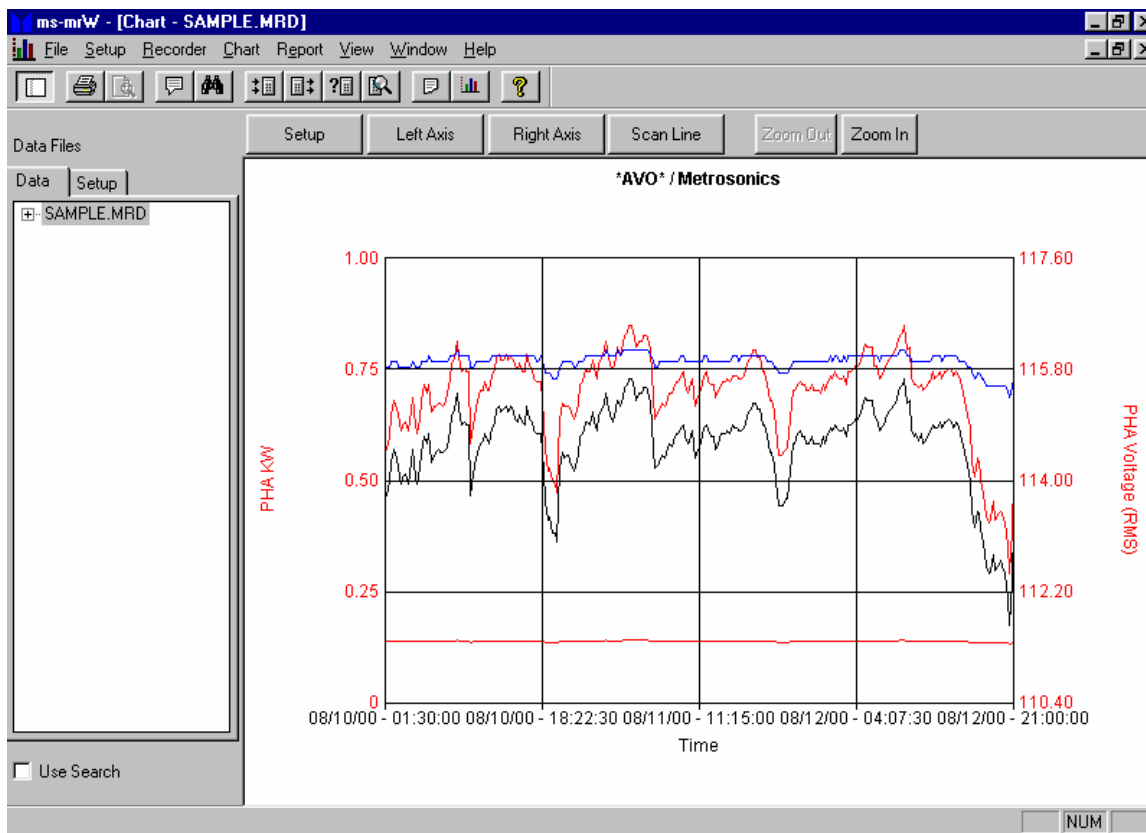
Waveform Chart Setup

To Create a Waveform Chart, perform the following steps:

1. Bring up a Metrosoft Chart Window for the selected data file (see *Charts*).

2. Make sure *Waveform* is the chart type selected in the left most list box of the Metrosoft Chart Window.

3. Optionally fill in the Chart Title.

4. Select which Harmonic Event you wish to chart by typing in the event number in the *Event Data* box.

Select which of the available traces you wish to chart. The lower panel of the Metrosoft Chart Window displays a grid containing each reading that is available to display.

5. To enable a trace (make it show up in the chart) check the checkbox to the left of the trace name.

Optional – set the lower and upper limits of the Y Axis for each trace by:

1. Enabling the limit by checking the checkbox to the left of the limit reading.

2. Typing in a limit value.

Trace Color – set a trace's color in the chart by clicking on the trace color rectangle for that trace. A list box containing the available colors for the trace will appear. Click on the desired trace color to close the list box.

Click the **Create** button on the upper left of the Metrosoft Chart Window. The Metrosoft Chart Window will then display your chart.

To change the setup of your chart once it is created, simply click the **Setup** button in the upper left corner of the Metrosoft Chart Window. The view will return to the Chart Setup view.

Sample Waveform Chart:
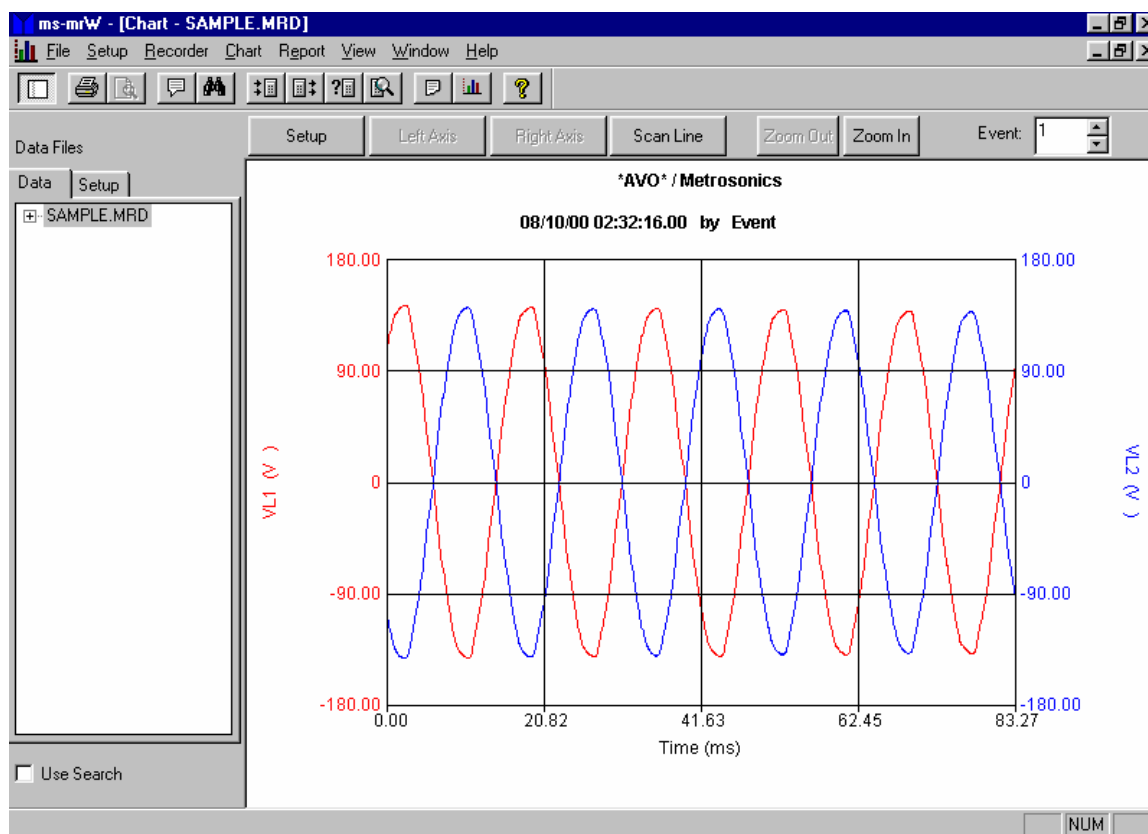
Manipulating The Chart

The Metrosoft Chart Display has many features:

Left and Right Axis labels - The Metrosoft Chart Display uses two Y Axis scales. When a chart with more than two traces is created, there are more than two possible Y Axis scales to display. The Left Axis and Right Axis buttons at the top of the Metrosoft Chart Display allow the user to cycle through the available Y Axis scales to display.

Sizing - The Metrosoft Chart Display sizes itself according to the size of its window. To make the Chart appear larger, simply resize the window.

Scan Line - The Metrosoft Chart Display can display a vertical line denoting the current position in the data you are viewing. To make the Scan Line appear, click the **Scan Line** button at the upper right of the Metrosoft Chart Display. *To make the Scan Line disappear, click the "Scan Line" button again. To move the Scan Line, click the right mouse button at the position you wish the scan line to move to.*

Scan Line Values Window - When the Scan Line is displayed, a small popup window also appears. This window displays the values of each trace at the point in time specified by the Scan Line.

Vector Diagram Window - If the data you are viewing contains Vector Information (Demand Charts only), a Vector Diagram window will also appear. The Vector Information displayed in the window also updates as the Scan Line is moved.

Zooming on the Chart

To zoom in on a particular area in a Metrosoft Chart Window:

1. Position the mouse pointer over the top left corner of the area you wish to zoom in on.

2. Click and hold down the left mouse button, dragging the mouse pointer down and to the right. The Metrosoft Chart Window will draw a "selection rectangle" as you drag.

    When the "selection rectangle" fully encompasses the area you wish to zoom in on, release the left mouse button. The Metrosoft Chart Window will then zoom in on the area delimited by the selection rectangle you just created, or click on the **Zoom In** button.

3. To zoom out, click on the **Zoom Out** button.
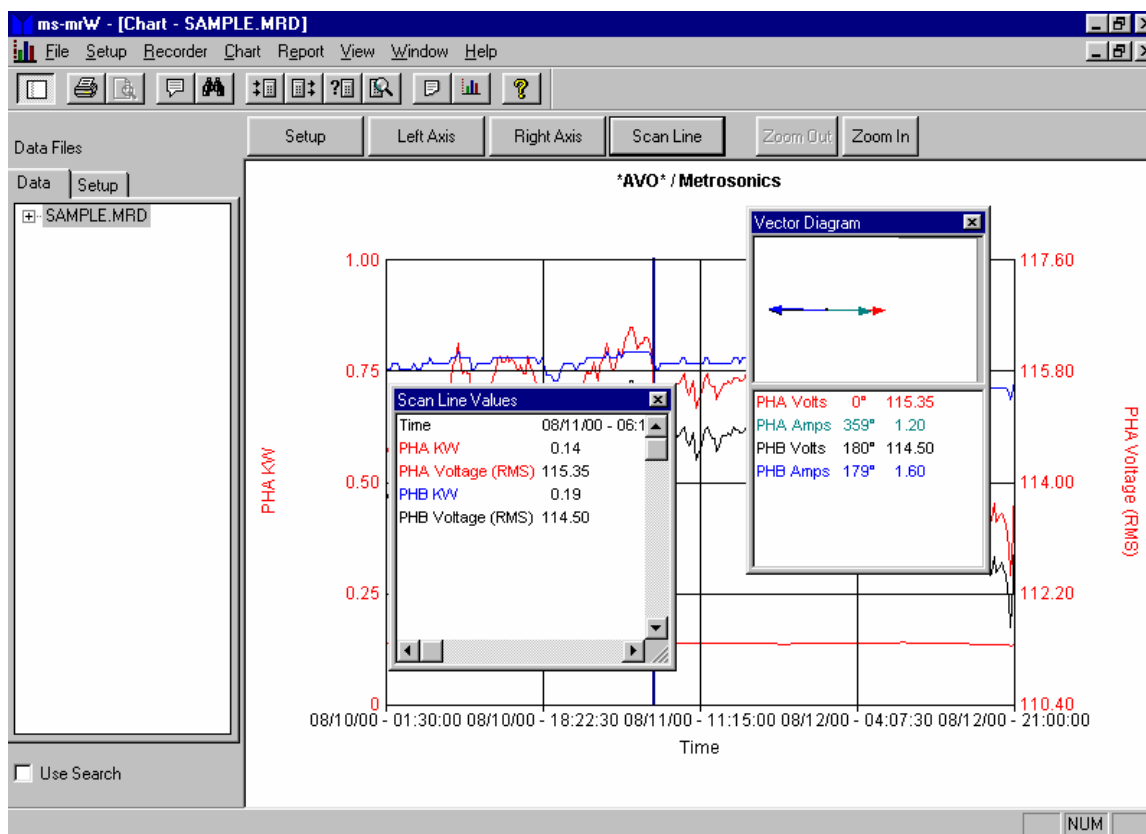
Manual Ranges on the Chart

See *RMS Chart Setup, Demand Chart Setup*, and *Waveform Chart Setup*.

Print or Plot the Chart

To print or plot a chart:

1. Make sure the printing device you wish to use is currently selected to receive print jobs. Metrosoft provides a *Printer Setup* dialog box that the user can bring up from the File menu (File/Printer Setup)

2. Make sure that the Metrosoft Chart Window you wish to print out is the currently selected window.

3. From the File Menu, select the **Print** menu item.

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REPORT GENERATION

To create a Report using Metrosoft:

Select the data file containing the data you wish to report using the Side Bar. Bring up a Metrosoft Report Window:

Mouse: Click on **Report** in the menu bar. Then from the pull down menu, click on **Create**.

Keyboard: Choose the *Report/Create* option from the menu bar by pressing (Alt+R,C).

A Metrosoft Report Window will appear, like the one pictured below.

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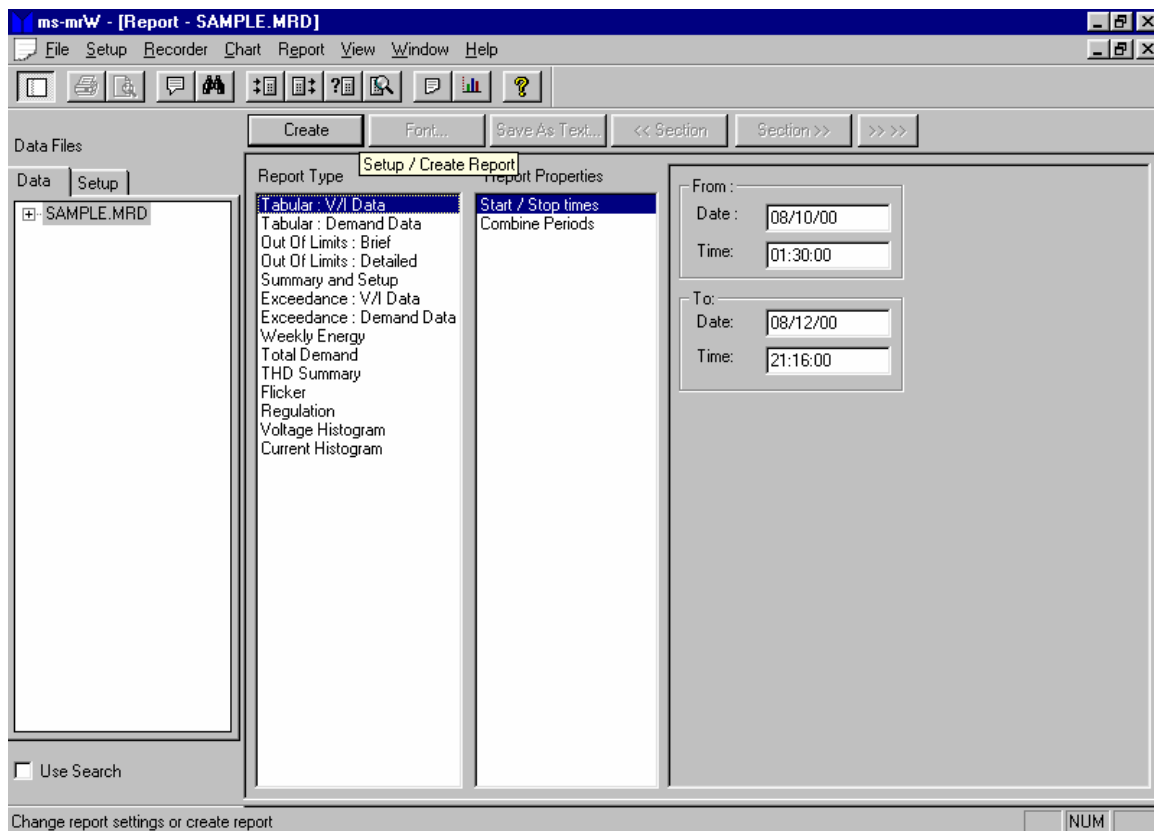
Depending on what data is present in the selected data file, the available types of reports to create will be listed in the left-most list box of the Report Window.

Select the type of report you wish to create simply by clicking on it in the left-most list box. Further options for configuring the type of report you selected will appear.

For information on configuring each report type, see;

- *Tabular: V/I Data Report*
- *Tabular: Demand Data Report*
- *Out Of Limits: Brief Report*
- *Out Of Limits: Detailed Report*
- *Summary and Setup Report*
- *Exceedance: V/I Data Report*
- *Exceedance: Demand Data Report*

- *Weekly Energy Report*
- *Total Demand Report*
- *THD Summary Report*
- *Flicker Report*
- *Regulation Report*
- *Voltage Histogram Report*
- *Current Histogram Report*

After you have configured your report, click the **Create** button in the upper left corner of the Report Window. Your report will appear.

To change the configuration of your report, click the **Setup** button in the upper left corner of the Report Window.

Tabular: V/I Data Report

The Voltage/Current RMS Data Tabular Report shows the total number of RMS intervals recorded, number of periods combined to create the report, current date, and data recorded for each input for each RMS storage interval (typically minimum RMS, RMS, and maximum RMS) in time correlated columnar form.

To Create a Tabular: V/I Data Report, perform the following steps:

1. Bring up a Metrosoft Report Window for the selected data file (see *Report Generation*).

2. Make sure *Tabular: V/I Data* is the report type selected in the left most list box of the Metrosoft Report Window.

3. Optionally, specify the Start and Stop Date and Times for the report by selecting **Start/Stop Times** from the *Report Properties* list box, then typing in the *Dates* and *Times*. The default values cover the entire range of the test.

4. Optionally specify the number of periods to combine by selecting **Combine Periods** from the *Report Properties* list box, then entering the number of periods you wish to combine. The allowed range is from 1 period to 100 periods.

5. Click the **Create** button on the upper left of the Metrosoft Report Window. The Metrosoft Report Window will then display your report.

6. To change the setup of your report once it is created, click the **Setup** button in the upper left corner of the Metrosoft Report Window. The view will return to the Report Setup view.

Sample Tabular: V/I Data Report:

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Tabular: Demand Data Report

The Demand Data Tabular Report shows total demand intervals recorded, data recorded for each input pair for each demand interval (voltage, current, KW, KVAR, KVA, KWH, KVAH, true power factor, and displacement power factor), totals for each demand parameter, and voltage and current imbalance, in a time correlated columnar form.

To Create a Tabular: Demand Data Report, perform the following steps:

1. Bring up a Metrosoft Report Window for the selected data file (see *Report Generation*).

2. Make sure *Tabular: Demand Data* is the report type selected in the left most list box of the Metrosoft Report Window.

3. Optionally specify the *Start and Stop Date and Times* for the report by selecting **Start/Stop Times** from the *Report Properties* list box, then typing in the Dates and Times. The default values cover the entire range of the test.

4. Click the **Create** button on the upper left of the Metrosoft Report Window. The Metrosoft Report Window will then display your report.

5. To change the setup of your report once it is created, click the **Setup** button in the upper left corner of the Metrosoft Report Window. The view will return to the Report Setup view.

Sample Tabular: Demand Data Report:

Out Of Limits: Brief Report

The Brief Out Of Limits Report shows information on each input that had an exceedance event. This information includes the event start date and time, end date and time, duration, and readings on the input that went out of limits. This report also includes the total number of exceedances for the test, number of exceedances that occurred on each input.

To Create an Out Of Limits: Brief Report, perform the following steps:

1. Bring up a Metrosoft Report Window for the selected data file (see *Report Generation*).

2. Make sure *Out Of Limits: Brief* is the report type selected in the left most list box of the Metrosoft Report Window.

3. Click the **Create** button on the upper left of the Metrosoft Report Window. The Metrosoft Report Window will then display your report.

Sample Out of Limits: Brief Report:

Megger.

Out Of Limits: Detailed Report

The Detailed Out Of Limits Report includes detailed information on each out of limits event that occurred. This information includes, for each event, the limit value that was exceeded, which input went out of limits, start date and time of the event, end date and time of the event, event duration, min, RMS, and max values for each input during the event. This report also lists the total number of exceedances for the test.

To create an Out Of Limits: Detailed Report, perform the following steps:

1. Bring up a Metrosoft Report Window for the selected data file (see *Report Generation*).

2. Make sure *Out Of Limits: Detailed* is the report type selected in the left most list box of the Metrosoft Report Window.

3. Click the **Create** button on the upper left of the Metrosoft Report Window. The Metrosoft Report Window will then display your report.

Sample Out Of Limits: Detailed Report:
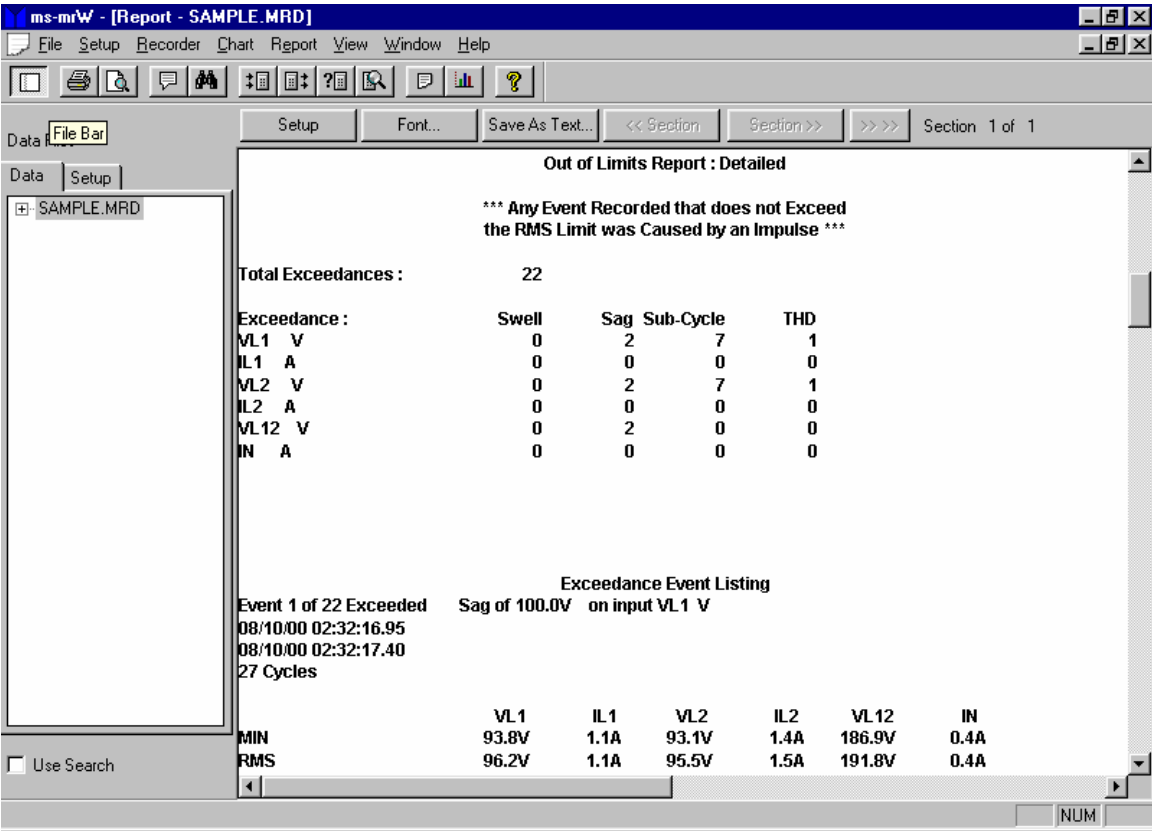
Summary and Setup Report

The Summary and Setup Report contains summary information about all types of data contained in the test file. If data is present, the report includes the following information:

- System Information
- Recorder Setup
- Power Consumption
- Power Projections - Hour, Day, Week, Month, Year
- Power Factor for Whole Test
- Maximum Imbalance for Whole Test
- Demand Data - Whole Test, Last Day, Last Hour
- Vector Information
- Recorder Exceedance Limits Setup
- Overall Voltage and Current Statistics
- Overall Events

To create a Summary and Setup Report, perform the following steps:

1. Bring up a Metrosoft Report Window for the selected data file (see *Report Generation*).

2. Make sure *Summary and Setup* is the report type selected in the left most list box of the Metrosoft Report Window.

3. Click the **Create** button on the upper left of the Metrosoft Report Window. The Metrosoft Report Window will then display your report.

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Sample Summary and Setup Report:


```
ms-mrW - [Report - SAMPLE.MRD]

File  Setup  Recorder  Chart  Report  View  Window  Help

Data Files          Setup    Font...   Save As Text...  << Section   Section >>   >> >>   Section  1 of 1

Data | Setup
                         <<< Summary report for mr4190 serial #  1217 >>>
⊞ SAMPLE.MRD
                                Power Consumption for Whole Test
                    Channel          KWH        KVARH        KVAH
                    PHA             9.364       0.000        9.364
                    PHB            12.572       0.087       12.572
                    Total          21.936       0.087       21.936

                                       Power Projections
                    PHA             Hour         Day        Week       Month        Year
                    KWH             0.138       3.318      23.224     100.984     1211.812
                    KVARH           0.000       0.000       0.000       0.000        0.000
                    KVAH            0.138       3.318      23.224     100.984     1211.812

                    PHB             Hour         Day        Week       Month        Year
                    KWH             0.186       4.454      31.181     135.581     1626.970
                    KVARH           0.001       0.031       0.215       0.935       11.220
                    KVAH            0.186       4.455      31.182     135.584     1627.008

                    Total           Hour         Day        Week       Month        Year
                    KWH             0.324       7.772      54.405     236.565     2838.781
                    KVARH           0.001       0.031       0.215       0.935       11.220
                    KVAH            0.324       7.772      54.406     236.567     2838.804

                                     Power Factor for Whole Test
                    Channel        Min PF       Date        Time     Max PF       Date        Time
                    PHA            +0.99      08/12/00    16:45:00    +1.00     08/12/00    20:45:00
                    PHB            +1.00      08/12/00    20:30:00    +1.00     08/12/00    21:15:00

☐ Use Search
                                                                                          NUM
```
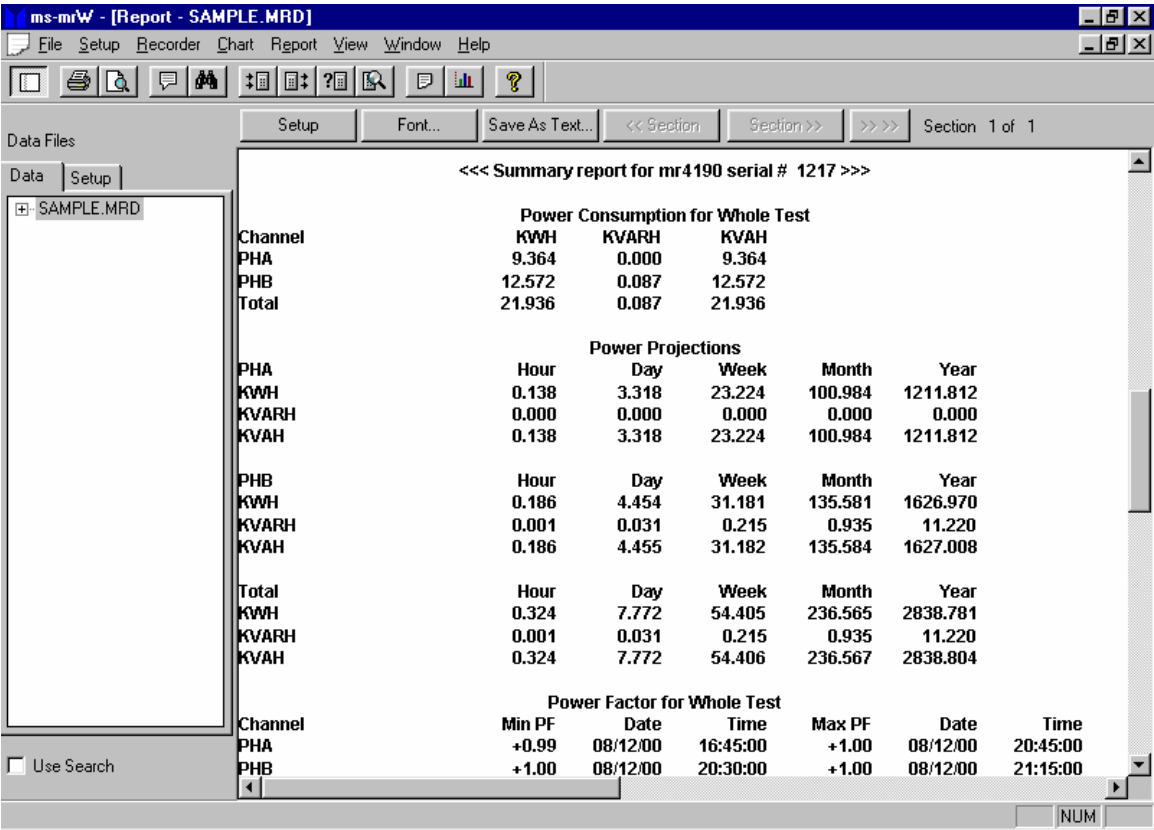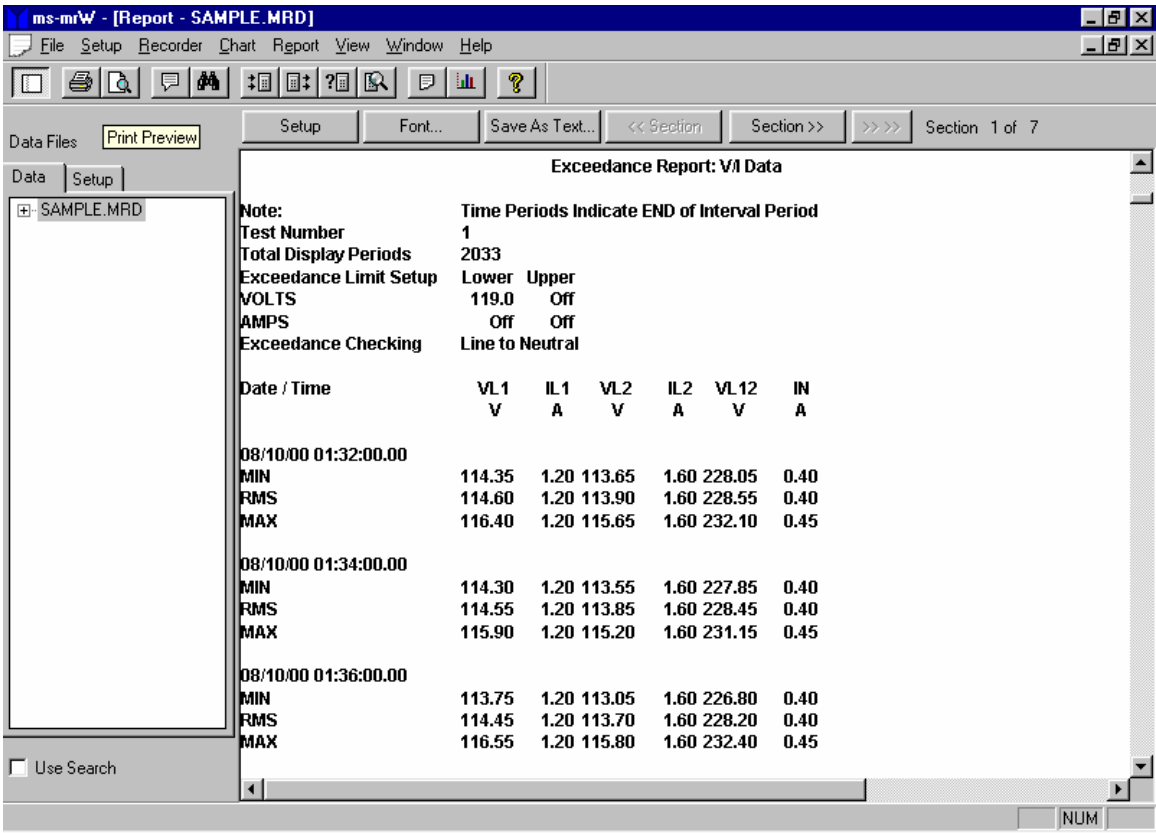
Exceedance: V/I Data Report

For the Voltage/Current Data Exceedance Report, the user specifies upper and lower limits, and then Metrosoft scans the recorded data and lists all occurrences in which the limits are exceeded. This information is presented in the same format as the tabular reports.

To create an Exceedance: V/I Data Report, perform the following steps:

1. Bring up a Metrosoft Report Window for the selected data file (see *Report Generation*).

2. Make sure *Exceedance: V/I Data* is the report type selected in the left most list box of the Metrosoft Report Window.

3. Optionally specify the Start and Stop Date and Times for the report by selecting **Start/Stop Times** from the *Report Properties* list box, then typing in the Dates and Times. The default values cover the entire range of the test.

4. Specify the Lower and Upper Exceedance Limits. Bring up the *V/I Exceedance Limits* property of the report by making sure **Exceedance: V/I Data** is selected in the left-most list box, and that **V/I Exceedance Limits** is selected in the *Report Properties* list box. As shown below, a grid will appear in the right panel to specify exceedance limits. Specify an exceedance limit by clicking on its position in the grid, and typing the numerical value of the limit. Enable the limit by clicking on the checkbox to the left of the number you type in.

5. Click the **Create** button on the upper left of the Metrosoft Report Window. The Metrosoft Report Window will then display your report.

6. To change the setup of your report once it is created, click the **Setup** button in the upper left corner of the Metrosoft Report Window. The view will return to the Report Setup view.

Sample Exceedance: V/I Data Report:

Exceedance: Demand Data Report

For the Exceedance: Demand Data Report, the user specifies upper and lower limits and then Metrosoft scans the recorded data and lists all occurrences in which the limits are exceeded. This information is presented in the same format as the tabular reports. Exceedance reports can be created for RMS data for both power quantity and power quality data files.

To create an Exceedance: Demand Data Report, perform the following steps:

1. Bring up a Metrosoft Report Window for the selected data file (see *Report Generation*).

2. Make sure **Exceedance: Demand Data** is the report type selected in the left most list box of the Metrosoft Report Window.

3. Optionally specify the *Start and Stop Date and Times* for the report by selecting **Start/Stop Times** from the *Report Properties* list box, then typing in the Dates and Times. The default values cover the entire range of the test.

4. Specify whether the Report will consider exceedance limits by Phase, or by Total. Make sure that the left-most list box has **Exceedance: Demand Data** selected, and that the *Report Properties* list box has **Exceedance Limits By** selected. A pair of "radio buttons" will appear in the right panel, one labeled "By Phase", and the other labeled "By Total". Click on the radio button that matches your desired setting.

5. Specify the Lower and Upper Exceedance Limits. Bring up the *Demand Exceedance Limits* property of the report by making sure **Exceedance: Demand Data** is selected in the left-most list box, and that **Demand Exceedance Limits** is selected in the *Report Properties* list box. As shown below, a grid will appear in the right panel to specify exceedance limits. Specify an exceedance limit by clicking on its position in the grid, and typing the numerical value of the limit. Enable the limit by clicking on the checkbox to the left of the number you type in.

6. Click the **Create** button on the upper left of the Metrosoft Report Window. The Metrosoft report Window will then display your report.

7. To change the setup of your report once it is created, click the **Setup** button in the upper left corner of the Metrosoft Report Window. The view will return to the Report Setup view.

Sample Exceedance: Demand Data Report:

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Weekly Energy Report

The Weekly Energy Report shows the demand parameters selected for each hour for up to 1 week. It includes the average value of that parameter for every hour for up to 1 week, the average for each day, and minimum and maximum with time of occurrence for each day. This is useful for spotting problem areas, and immediately spotting where demand is excessive so changes can be made to reduce demand charges.

To Create a Weekly Energy Report, perform the following steps:

1. Bring up a Metrosoft Report Window for the selected data file (see *Report Generation*).

2. Make sure **Weekly Energy** is the report type selected in the left-most list box of the Metrosoft Report Window.

3. Optionally specify the Start and Stop Date and Times for the report by selecting **Start / Stop Times** from the *Report Properties* list box, then typing in the Dates and Times. The default values cover the entire range of the test.

4. Specify the **Energy Parameter** reading you wish to get statistics on. Make sure that **Weekly Energy** is selected in the left-most list box, and that **Energy Parameter** is selected in the *Report Properties* list box. A dropdown list box will appear in the right panel containing the energy parameters that can be selected. These include, for each individual Phase, and for Total:

    KWH

    KVAH

    KVARH

    PF

    and for each individual Phase, V and I may also be specified as the Energy Parameter.

5. Click the **Create** button on the upper left of the Metrosoft Report Window. The Metrosoft report Window will then display your report.

6. To change the setup of your report once it is created, click the **Setup** button in the upper left corner of the Metrosoft Report Window. The view will return to the Report Setup view.

Sample Weekly Energy Report:

Total Demand Report

The Total Demand Report shows KW, KVAR, KVA, and Power Factor for totals in a time correlated columnar format.

To Create a Total Demand Report, perform the following steps:

1. Bring up a Metrosoft Report Window for the selected data file (see *Report Generation*).

2. Make sure **Total Demand** is the report type selected in the left most list box of the Metrosoft Report Window.

3. Optionally specify the Start and Stop Date and Times for the report by selecting **Start/Stop Times** from the *Report Properties* list box, then typing in the Dates and Times. The default values cover the entire range of the test.

4. Click the Create button on the upper left of the Metrosoft Report Window. The Metrosoft Report Window will then display your report.

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5. To change the setup of your report once it is created, click the Setup button in the upper left corner of the Metrosoft Report Window. The view will return to the Report Setup view.

Sample Total Demand Report:

THD Summary Report

The Total Harmonic Distortion Summary Report shows the date and time each event for harmonic analysis occurred, and the total harmonic distortion (THD) on each channel as a percent of the fundamental for the first cycle of each event.

To Create a THD Summary Report, perform the following steps:

1. Bring up a Metrosoft Report Window for the selected data file (see *Report Generation*).

2. Make sure **THD Summary** is the report type selected in the left most list box of the Metrosoft Report Window.

3. Click the **Create** button on the upper left of the Metrosoft Report Window. The Metrosoft Report Window will then display your report.

Sample THD Summary Report:

Flicker Report

The Flicker Report uses the programmed flicker setup information, along with details on each flicker event detected on voltage line 1 and voltage line 2. For each flicker event detected, the flicker report lists the start time of the event, the time period of the flicker, the magnitude of the fluctuation and the number of fluctuations.

To Create a Flicker Report, perform the following steps:

1. Bring up a Metrosoft Report Window for the selected data file (see *Report Generation*).

2. Make sure **Flicker** is the report type selected in the left most list box of the Metrosoft Report Window.

3. Click the **Create** button on the upper left of the Metrosoft Report Window. The Metrosoft Report Window will then display your report.

Sample Flicker Report:
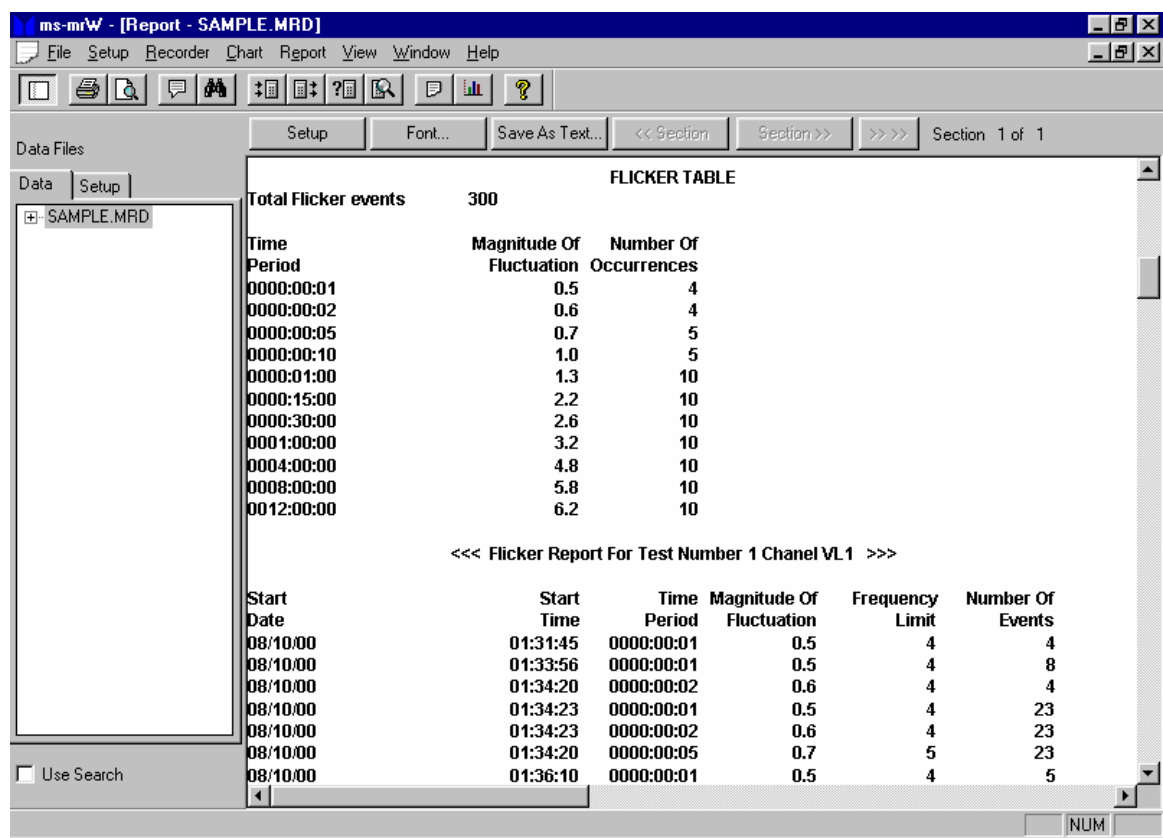
Regulation Report

The Regulation Report shows the RMS values recorded for each input at evenly spaced intervals of time throughout the day. You setup the time intervals when programming the MR4 to save regulation data (see *Programming The Recorder*).

To Create a Regulation Report, perform the following steps:

1. Bring up a Metrosoft Report Window for the selected data file (see *Report Generation*).

2. Make sure **Regulation** is the report type selected in the left most list box of the Metrosoft Report Window.

3. Click the **Create** button on the upper left of the Metrosoft Report Window. The Metrosoft Report Window will then display your report.

Sample Regulation Report:


```
ms-mrW - [Report - SAMPLE.MRD]
File  Setup  Recorder  Chart  Report  View  Window  Help

      Setup      Font...     Save As Text...   << Section   Section >>   >> >>   Section  1 of  1

Data Files
                      <<<  Regulation report for MR4 mr4190 serial # 1217  >>>
Data  Setup
                     Time                 VL1    IL1   VL2    IL2   VL12    IN
 SAMPLE.MRD                               V      A     V      A     V       A
                     0000:10:00          115.5   1.2  114.7   1.6  230.2   0.5
                     0000:20:00          115.7   1.2  114.8   1.6  230.5   0.5
                     0000:30:00          115.7   1.2  114.8   1.6  230.6   0.5
                     0000:40:00          115.7   1.2  114.8   1.6  230.6   0.5
                     0000:50:00          115.8   1.2  114.9   1.6  230.7   0.5
                     0001:00:00          115.8   1.2  115.1   1.6  230.9   0.5
                     0001:10:00          116.0   1.2  115.2   1.6  231.2   0.5
                     0001:20:00          115.9   1.2  115.1   1.6  231.0   0.5
                     0001:30:00          115.8   1.2  115.0   1.6  230.8   0.5
                     0001:40:00          115.4   1.2  114.6   1.6  230.0   0.5
                     0001:50:00          115.3   1.2  114.6   1.6  229.9   0.5
                     0002:00:00          115.4   1.2  114.6   1.6  230.1   0.5
                     0002:10:00          115.6   1.2  114.8   1.6  230.3   0.5
                     0002:20:00          115.7   1.2  114.8   1.6  230.6   0.5
                     0002:30:00          115.7   1.2  114.8   1.6  230.6   0.5
                     0002:40:00          115.7   1.2  114.8   1.6  230.4   0.5
                     0002:50:00          115.7   1.2  114.8   1.6  230.5   0.5
                     0003:00:00          115.6   1.2  114.8   1.6  230.4   0.5
                     0003:10:00          115.7   1.2  114.8   1.6  230.5   0.5
                     0003:20:00          115.6   1.2  114.8   1.6  230.4   0.5
                     0003:30:00          115.7   1.2  114.8   1.6  230.6   0.5
                     0003:40:00          115.8   1.2  114.9   1.6  230.7   0.5
                     0003:50:00          115.7   1.2  114.8   1.6  230.6   0.5
                     0004:00:00          115.8   1.2  114.9   1.6  230.7   0.5

Use Search
                                                                              NUM
```

Voltage Histogram Report

The Voltage Histogram Report shows the distribution of the voltage levels recorded. It breaks down the voltage range (from 50V to 300V) into 5V increments and lists the percentage of data that falls within each voltage range.

To Create a Voltage Histogram Report, perform the following steps:

1. Bring up a Metrosoft Report Window for the selected data file (see *Report Generation*).

2. Make sure **Voltage Histogram** is the report type selected in the left most list box of the Metrosoft Report Window.

3. Click the **Create** button on the upper left of the Metrosoft Report Window. The Metrosoft Report Window will then display your report.

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Sample Voltage Histogram Report:

```
ms-mrW - [Report - SAMPLE.MRD]
 File  Setup  Recorder  Chart  Report  View  Window  Help
```

Data Files	<<< Histogram report for MR4 mr4190 serial # 1217 >>>
	<<< Total Samples: 14630973 >>>

Setup | Font... | Save As Text... | << Section | Section >> | >> >> | Section 1 of 1

```
                          VL1       VL2       VL12
V                      % of total % of total % of total
< 50.0                   0.00      0.00      0.00
50.0 - 54.9              0.00      0.00      0.00
55.0 - 59.9             0.00      0.00      0.00
60.0 - 64.9             0.00      0.00      0.00
65.0 - 69.9             0.00      0.00      0.00
70.0 - 74.9             0.00      0.00      0.00
75.0 - 79.9             0.00      0.00      0.00
80.0 - 84.9             0.00      0.00      0.00
85.0 - 89.9             0.00      0.00      0.00
90.0 - 94.9             0.00      0.00      0.00
95.0 - 99.9             0.00      0.00      0.00
100.0 - 104.9           0.00      0.00      0.00
105.0 - 109.9           0.00      0.00      0.00
110.0 - 114.9          17.48     73.12      0.00
115.0 - 119.9          82.52     26.88      0.00
120.0 - 124.9           0.00      0.00      0.00
125.0 - 129.9           0.00      0.00      0.00
130.0 - 134.9           0.00      0.00      0.00
135.0 - 139.9           0.00      0.00      0.00
140.0 - 144.9           0.00      0.00      0.00
145.0 - 149.9           0.00      0.00      0.00
150.0 - 154.9           0.00      0.00      0.00
155.0 - 159.9           0.00      0.00      0.00
```

Data | Setup
SAMPLE.MRD

Use Search

NUM

Current Histogram Report

The Current Histogram Report shows a distribution of the current levels recorded. It breaks down the current range (from 0A to 250A) into 5A increments and lists the percentage of data that falls within each current range.

To Create a Current Histogram Report, perform the following steps:

1. Bring up a Metrosoft Report Window for the selected data file (see *Report Generation*).

2. Make sure **Current Histogram** is the report type selected in the left most list box of the Metrosoft Report Window.

3. Click the **Create** button on the upper left of the Metrosoft Report Window. The Metrosoft Report Window will then display your report.
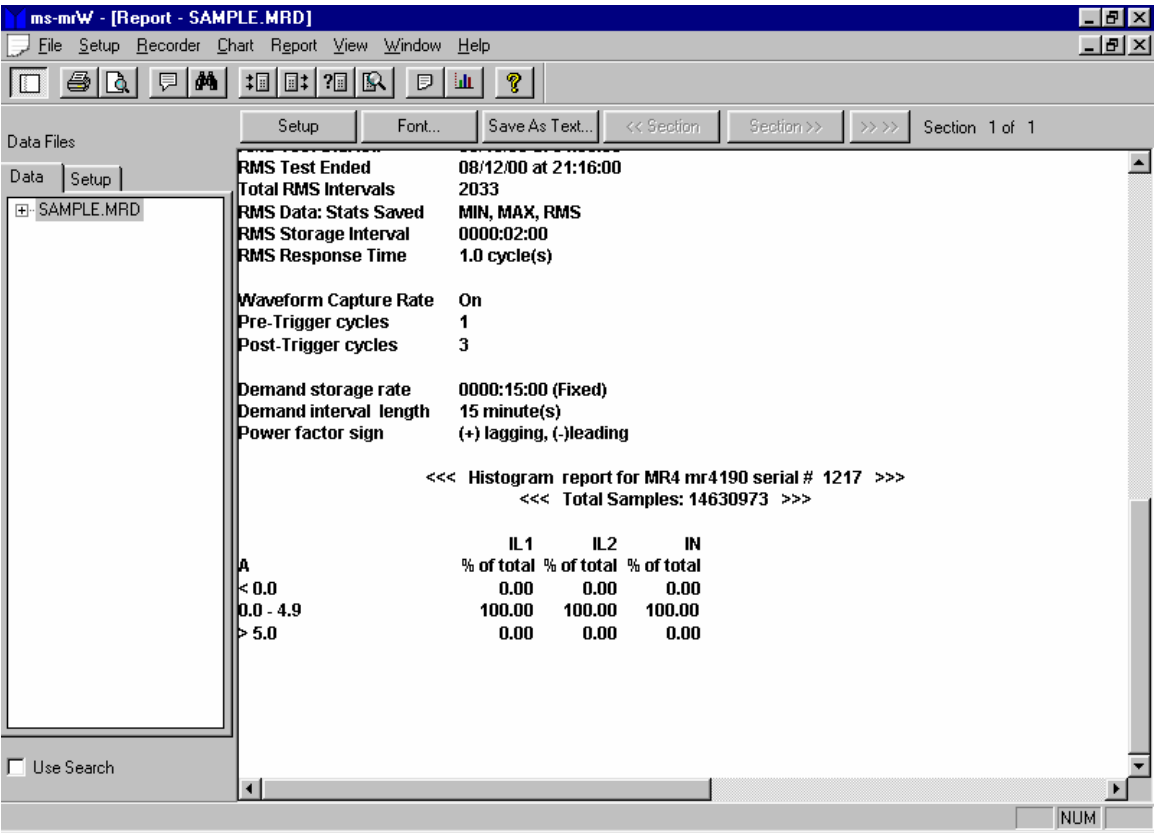
Sample Current Histogram Report:

```
ms-mrW - [Report - SAMPLE.MRD]                                              _ 回 ×
File  Setup  Recorder  Chart  Report  View  Window  Help                   _ 回 ×

[toolbar icons]

        Setup     Font...    Save As Text...   << Section    Section >>    >> >>   Section  1 of  1

Data Files                RMS Test Ended        08/12/00 at 21:16:00
                          Total RMS Intervals   2033
Data | Setup |            RMS Data: Stats Saved MIN, MAX, RMS
⊞ SAMPLE.MRD              RMS Storage Interval  0000:02:00
                          RMS Response Time     1.0 cycle(s)

                          Waveform Capture Rate On
                          Pre-Trigger cycles    1
                          Post-Trigger cycles   3

                          Demand storage rate   0000:15:00 (Fixed)
                          Demand interval length 15 minute(s)
                          Power factor sign     (+) lagging, (-)leading

                                   <<<  Histogram  report for MR4 mr4190 serial #  1217  >>>
                                          <<<  Total Samples: 14630973  >>>

                                          IL1        IL2         IN
                          A             % of total % of total % of total
                          < 0.0            0.00      0.00       0.00
                          0.0 - 4.9      100.00    100.00     100.00
                          > 5.0            0.00      0.00       0.00

☐ Use Search

                                                                                      NUM
```

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PROBLEMS COMMUNICATING WITH A RECORDER (TROUBLESHOOTING)

If Metrosoft is unable to establish communication with a recorder, see *Verifying Communication with the Recorder*.

Also see the web site FAQ page for helpful up to date troubleshooting guidelines. (*www.megger.com*).

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18

HARMONIC ANALYSIS

Metrosoft can produce detailed Harmonic Analysis views for data files that contain Harmonic data.

See *Programming the Recorder* for instructions for programming the MR4 to record harmonic event data.

To create a Harmonic Analysis chart:

Mouse: Click on **Chart** in the menu bar. Then from the pull down menu, click on **Harmonic Analysis**.

Keyboard: Choose the *Chart/Harmonic Analysis* option from the menu bar by pressing (Alt+C,A).

The Harmonic Analysis Chart works in a similar manner to the other Charts. The Harmonic Analysis chart consists of two parts: The Setup Screen, and the View Screen.

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Setup Screen

An example of the Harmonic Analysis Setup screen follows.
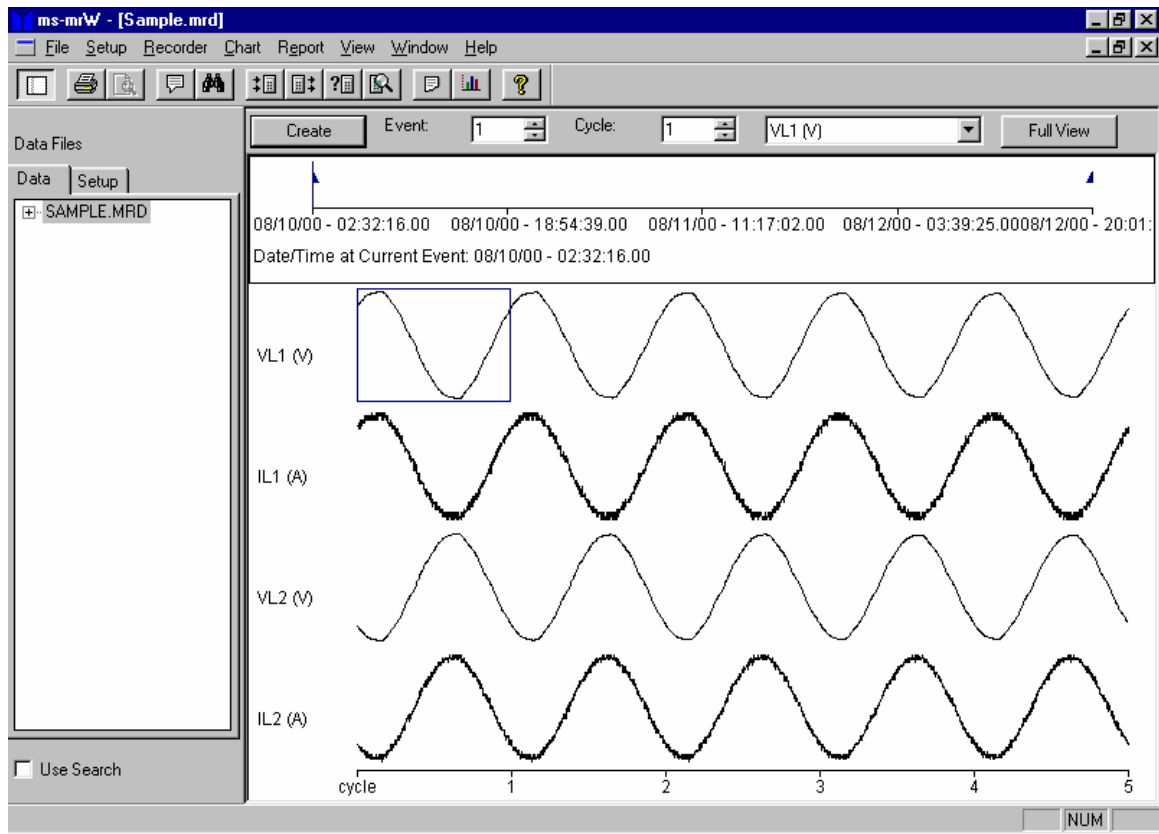
The Harmonic Analysis Setup Screen has two views, the Upper View, and the Lower View.

Upper View

The Upper View displays all harmonic events in a chart. The chart has a triangle denoting each event. The x axis of the chart shows the time of each event. The user can select a certain event for further analysis by right – clicking on the corresponding triangle. The chart's scan line will move to the event that was clicked on.

Zooming   If there are a large number of harmonic events, the user can select a smaller subset by zooming in on a section of the display. For instructions on how to zoom on a chart, see *Zooming on the Chart*. To go back to the original view, click the **Full View** button at the upper right corner.

Select Input	The input for which the user wishes to view data is selected by using the drop down list box positioned immediately to the left of the *Full View* button.
Selecting Event and Cycle	The user can also select an harmonic event for further analysis by using the controls at the top of the Harmonic Analysis View. The Harmonic Event the user wishes to study can be selected by using the 'spin control' immediately to the right of the word "Event". Similarly, the particular cycle within the event can be selected by using the 'spin control' immediately to the right of the word "Cycle".

Lower View

The Lower View simultaneously displays waveform data for all enabled inputs. Up to 10 cycles of each event are shown for each input.

Selecting Input, Event, and Cycle

As an alternative method for specifying the Input, Event, and Cycle Number, the user can simply click on the waveform trace you wish to analyze further.

NOTE: Since the Lower View only displays up to 10 cycles per input, if the user wishes to analyze a cycle past the tenth cycle, the user must use the controls of the Upper View.

Once the Input, Event, and Cycle have been specified by any of the above methods, the user can press the **Create** button to go the View Screen, which shows detailed information about the selected Cycle within the Waveform Event for the Input specified.

View Screen

Once the Input, Event, and Cycle have been selected from the Setup View, pressing **Create** in the upper left corner of the window switches the user to the *View Screen*. Note that the user can select a different event, cycle number, and input from the control bar at the top of the View Screen.

The View Screen shows detailed harmonic analysis data for the selected cycle within the Event for the selected Input. Specifically, the View Screen Shows:
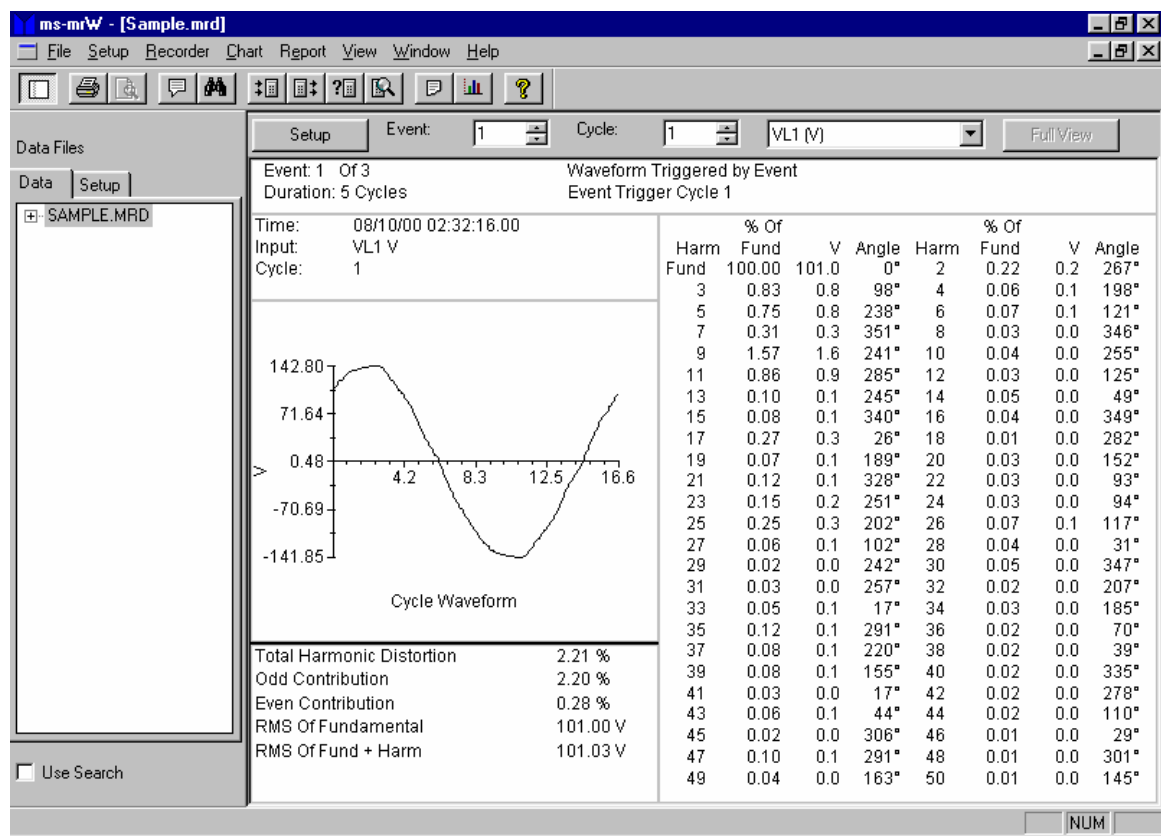
- Event Number / Total Number of Events
- Duration of Event
- Event trigger reason (Time or Exceedance)
- Time, Input, and Cycle

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- Cycle Waveform chart
- Harmonic Distortion Data. and either
- Harmonic Contribution Table *or* Harmonic Contribution Bar Chart
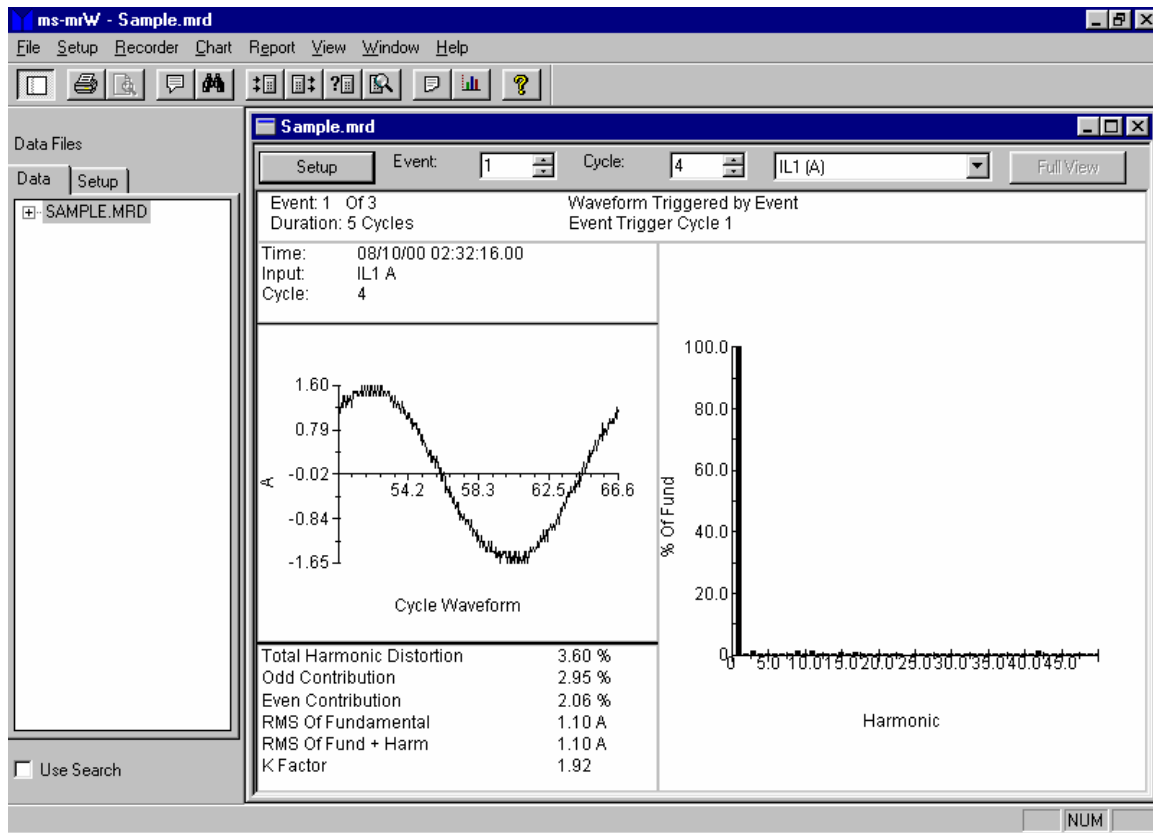
You select the bar chart by checking or unchecking the *Show Bar Chart* menu item in the Chart menu.

Two Examples of the Harmonic View Screen are shown below. The first example shows the Harmonic Contribution Table, and the second example shows the Harmonic Contribution Bar Chart.

Harmonic Contribution Table:

ms-mrW - [Sample.mrd]

File Setup Recorder Chart Report View Window Help

Data Files

Data | Setup

SAMPLE.MRD

Use Search

Setup   Event: 1   Cycle: 1   VL1 (V)   Full View

Event: 1 Of 3   Waveform Triggered by Event
Duration: 5 Cycles   Event Trigger Cycle 1

Time: 08/10/00 02:32:16.00
Input: VL1 V
Cycle: 1

Harm	% Of Fund	V	Angle	Harm	% Of Fund	V	Angle
Fund	100.00	101.0	0°	2	0.22	0.2	267°
3	0.83	0.8	98°	4	0.06	0.1	198°
5	0.75	0.8	238°	6	0.07	0.1	121°
7	0.31	0.3	351°	8	0.03	0.0	346°
9	1.57	1.6	241°	10	0.04	0.0	255°
11	0.86	0.9	285°	12	0.03	0.0	125°
13	0.10	0.1	245°	14	0.05	0.0	49°
15	0.08	0.1	340°	16	0.04	0.0	349°
17	0.27	0.3	26°	18	0.01	0.0	282°
19	0.07	0.1	189°	20	0.03	0.0	152°
21	0.12	0.1	328°	22	0.03	0.0	93°
23	0.15	0.2	251°	24	0.03	0.0	94°
25	0.25	0.3	202°	26	0.07	0.1	117°
27	0.06	0.1	102°	28	0.04	0.0	31°
29	0.02	0.0	242°	30	0.05	0.0	347°
31	0.03	0.0	257°	32	0.02	0.0	207°
33	0.05	0.1	17°	34	0.03	0.0	185°
35	0.12	0.1	291°	36	0.02	0.0	70°
37	0.08	0.1	220°	38	0.02	0.0	39°
39	0.08	0.1	155°	40	0.02	0.0	335°
41	0.03	0.0	17°	42	0.02	0.0	278°
43	0.06	0.1	44°	44	0.02	0.0	110°
45	0.02	0.0	306°	46	0.01	0.0	29°
47	0.10	0.1	291°	48	0.01	0.0	301°
49	0.04	0.0	163°	50	0.01	0.0	145°

Cycle Waveform (values: 142.80, 71.64, 0.48, -70.69, -141.85; axis: 4.2, 8.3, 12.5, 16.6)

Total Harmonic Distortion	2.21 %
Odd Contribution	2.20 %
Even Contribution	0.28 %
RMS Of Fundamental	101.00 V
RMS Of Fund + Harm	101.03 V

NUM

Harmonic Contribution Bar Chart:

Print Out the Chart

To print your chart, select **Print** from the File menu.

Return to Setup View

To return to the Setup View, click the **Setup** button in the upper left corner of the Harmonic View Window.

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MISCELLANEOUS

This topic contains information about using the Side Bar, the File Information Window, and how to Edit File Information.

Side Bar

The side bar lists all of the data files in the data file directory, as well as the setup files in the setup file directory (see *Directory Setup*). The side bar has three tabs. Clicking on the tab brings up a listing of the files under the category the tab represents.

- The **Quantity** tab lists data files in the current data directory that were recorded under Quantity Mode.

- The **Quality** tab displays data files in the current data directory that were recorded under Quality mode.

- The **Setup** tab displays recorder setup files stored in the current setup file directory.

When a data file listing is selected, each test contained in the data file may be viewed by clicking on the 'plus' symbol (+) at the left of the data file listing. The Side Bar will then display sub-items, one for each test contained in the data file. Each sub-item lists the date and time of the test. Further information will be displayed in the lower part of the File Information Window as each test is selected.

If there is no file name selected, certain menu items and tool buttons will be inactive. To see this effect, change the data file directory, using the Configure-Directories menu option, to a directory containing no files with the .met extension.

The Use Search check box on the side bar forces a filter to be applied to the listed files. The filter may be accessed through the Search Criteria dialog box. If the check box is not checked, all data files in the data file directory will be listed.

A file may be selected by clicking on it with the left mouse button. To select more than one file from the side bar, simply hold down the control key when selecting other files. Up to four files may be selected at any time.

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When a side bar file has been highlighted with the mouse cursor the following
actions may be performed:

- Edit file information such as address and comments.

- Open the File Information dialog box by double clicking on the desired
  data file.

- Create a Metrosoft Chart or Report Window by clicking on the Report
  button or Chart Button in the toolbar, or by Choosing Chart/Create
  from the menu, or Report/Create from the menu.

An example of a Side Bar in Metrosoft:
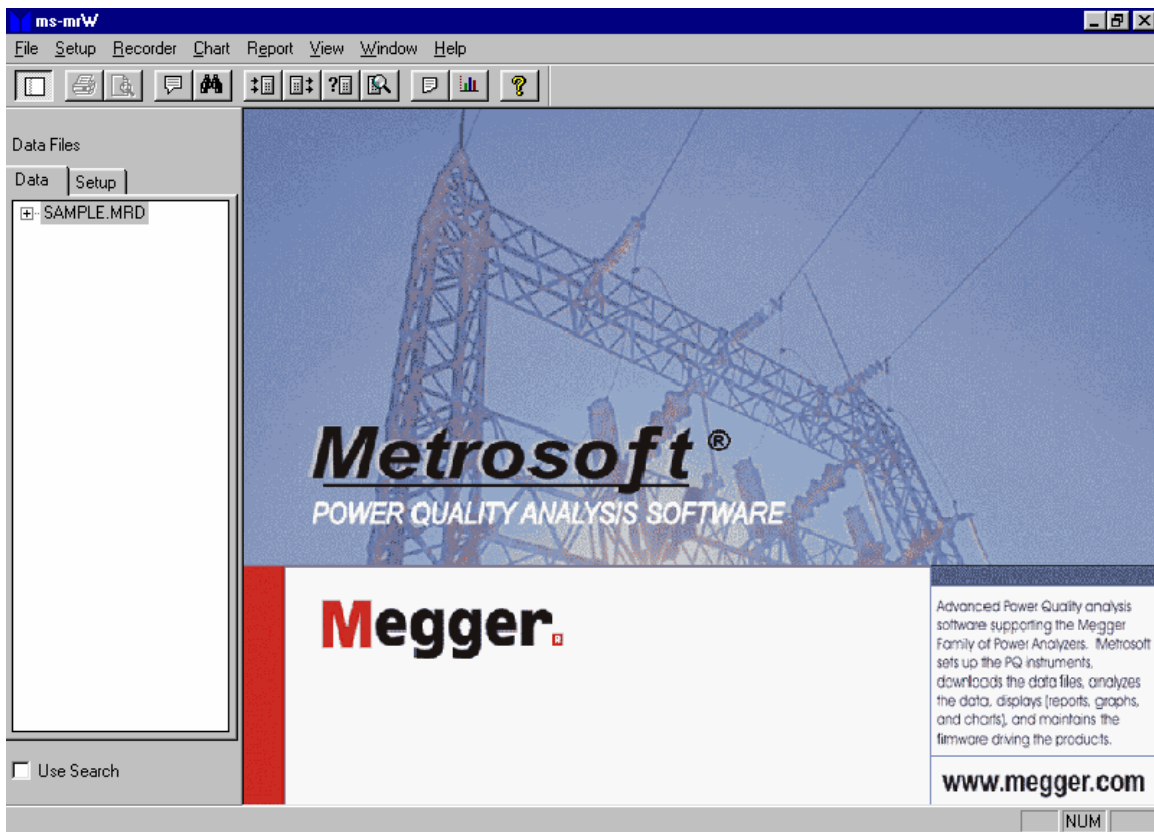
File Name Description

The file name includes a descriptor that indicates the unit P/N, and if the file is a
data or setup file.

Example:

> MR9005.mrd = MR Data File
> MR9005.mrs = MR Setup File

Edit File Information

Each Metrosoft Data File can store additional information along with data retrieved from a recorder. This additional information is usually input during the data retrieval process.

To edit information for an existing data file:

1. Select the data file whose information you wish to edit from the Side Bar.

2. From the File menu, select **Edit File Information**. The dialog pictured below will appear.

3. Add or edit text in each field by clicking in the field and typing.

4. Click **OK** to save your changes, *Cancel* to discard your changes.

Edit File Information	✕

Site Information

Field	Value	
Customer/Department:	*Megger* / Metrosonics	OK
Account/Meter Number:	0000-0000-0011-0012	Cancel
Address One:	85 Adams Ave	Help
Address Two:		
City:	Hauppauge	
State:	NY	
Zip Code:	11788	
Phone Number:	1-800-864-2240	
Comments 1:	Sample Data File	
Comments 2:		

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File Information

The File Information Window is used to get a quick summary of the contents of a certain data file. The File Information Window consists of an upper display, which displays operator-entered fields and basic recorder setup information, and the lower display, which displays summary information for each test in the file.

To display the File Information Window:

1. Select a data file in the Side Bar.

2. Select **Information** from the File Menu, or click the **File Information** button in the toolbar *or* double-click on a test file listing in the Side Bar.

To view information about each test in the lower part of the File Information Window:

In the Side Bar, for the currently selected data file, click on the plus (+) symbol to display sub-items. Each sub-item displays the Date and Time of a test. As each sub-item is selected, the lower part of the File Information Window will be updated with the statistics for that test.
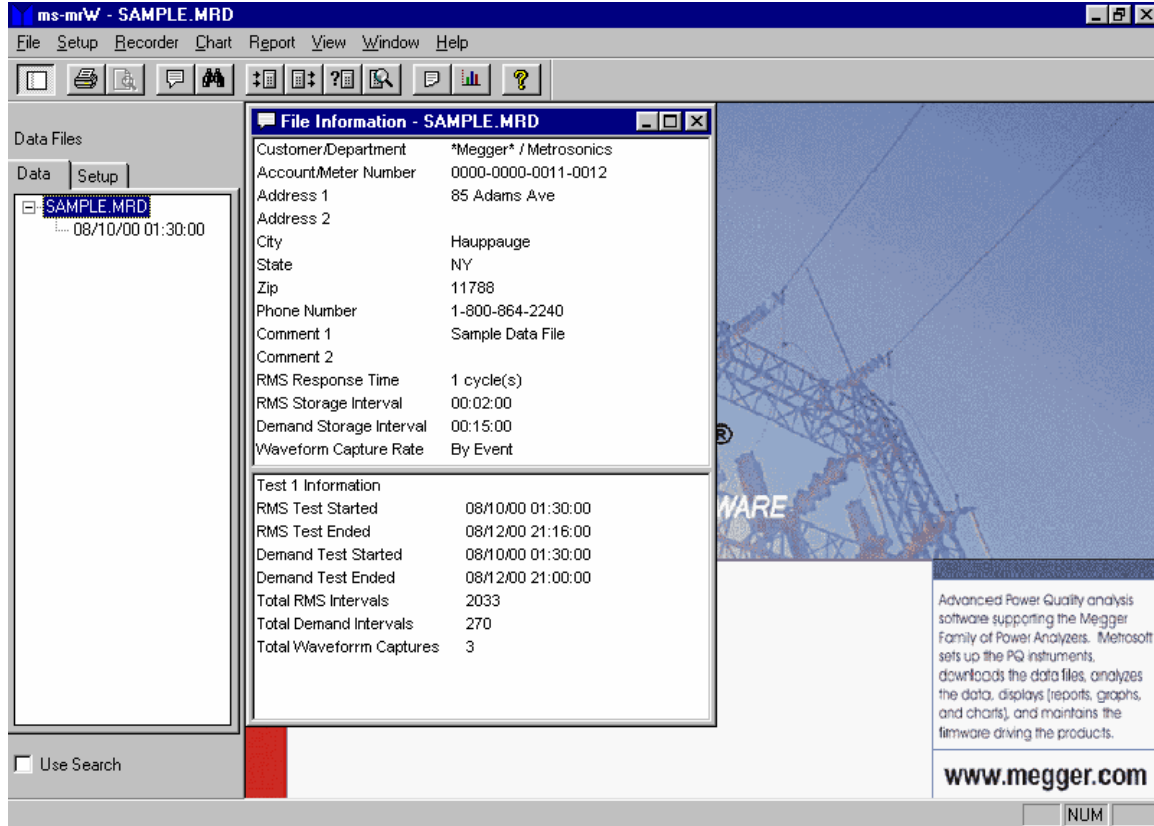
Importing Data Files

Metrosoft for Windows stores data in a database format different from the raw data files retrieved from a recorder.

When retrieving data using Metrosoft for Windows, the raw data file retrieved from a recorder is automatically converted to the new database format.

In order to use pre-existing .MR4 data files with Metrosoft for Windows, the operator must import the .MR4 data file into the new database format.

To import pre-existing data files into Metrosoft for Windows format:

1. Select the command **Import** under the *File* menu.

2. A standard Windows Open File dialog box will appear, asking the operator to select which data file(s) to import.

3. Select which files to import then click **OK**.

4. A Progress Dialog will appear, informing the operator which file is currently being converted. After the conversion process is complete, the new data file(s) will be copied into the current Metrosoft Data File directory. The new file(s) will show up in the Quantity or Quality tabs of the Side Bar, ready for use.

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