Technical Publication Change Instructions

Updated replacement pages and/or drawings are attached to this Technical Publication Change Instructions. Please follow the directions under **Publication Update Requirements** and replace corresponding pages with the attached pages provided. Failure to make these replacements may result in loss of product efficiency and possible failure. Please note that page numbers no longer have alpha suffixes, and now the revision level on newer publications adds a numerated suffix denoting its difference from the core revision. Most specific changes are identified by change bars in the corresponding margins. A replacement page with no numerated suffix means a change has not occurred, but the page is included because its page is double-sided.

Replacement pages will become standard pages at the next printing cycle. The Front Matter (excluding Cover page), Table of Contents, List of Illustrations and Tables, Preface (in most cases) and Index will be updated at this cycle. For record purposes you are encouraged to retain this TPCI as a permanent part of the publication. Record changes in your publication's Preface section (Under newer Giga-tronics publications, "Record of Publication Changes", in older, "Record of Manual Changes").

Publication	Former P/N, Revision & Date	Updated P/N, Revision & Date
Series 8650A Universal Power Meters Operation Manual	31470, Rev. F, July 2002	31470, Rev. G, November 2002

Publication Update Requirements

Change Originator			Replace Old Page(s)/ Add New Page(s)	Remarks
ECO	CAR	QIR		
ECO 8315			Replace old first 2 pages of Front Matter with new.	Update to revision level Rev. G - Date, November 2002.
ECO 8303			Replace old page 3-108 with new.	Update to revision level Rev. G - Date, November 2002.
			Replace old pages 2-21 to 2-22 with new.	Update to revision level Rev. G - Date, November 2002.

This Page will be left intentionally blank in most cases, due to continuity issues

Giga-tronics

www.gigatronics.com

Series 8650A Universal Power Meters

Operation Manual

Publication 31470, Rev. G, November 2002

Registered 04 June 1996 ❖ Amended 10 September 2001
CE Certified Product
ISO 9001 Certified Process
Registrar: BSI, Certification FM 34226

Giga-tronics Incorporated ❖ 4650 Norris Canyon Road, San Ramon, CA 94583
925.328.4650/800.726.4442/925.328.4700 (Fax) ❖ Customer Service: 800.444.2878/925.328.4702 (Fax)

WARRANTY

Giga-tronics Series 8650A instruments are warranted against defective materials and workmanship for two years from date of shipment. Giga-tronics will at its option repair or replace products that are proven defective during the warranty period. This warranty DOES NOT cover damage resulting from improper use, nor workmanship other than Giga-tronics service. There is no implied warranty of fitness for a particular purpose, nor is Giga-tronics liable for any consequential damages. Specification and price change privileges are reserved by Giga-tronics.

MODEL NUMBERS

The series 8650A includes two models: The single-channel Model 8561A and the dual-channel Model 8652A. Apart from the number of sensors they support, the two models are identical. Both models are referred to in this manual by the general term 8650A, except where it is necessary to make a distinction between the models.

Giga-tronics

Giga-tronics Incorporated
4650 Norris Canyon Road
San Ramon, CA 94583
Tel: 925/328-4650
Fax: 925/328-4700

DECLARATION OF CONFORMITY

Application of Council Directive(s)

Standard(s) to which Conformity is Declared:

89/336/EEC and 73/23/EEC	EMC Directive and Low Voltage Directive
EN61010-1/1A (1993)	Electrical Safety
EN61326-1 (1997)	EMC – Emissions & Immunity

Manufacturer's Name:
Giga-tronics Incorporated

Manufacturer's Address:
4650 Norris Canyon Road
San Ramon, California 94583
U.S.A.

Type of Equipment:
Universal Power Meter

Model Series Number:
8650A

Model Number(s) in Series:
8651A
8652A

With Sensor Series 803XXA, 804XXA, 806XXA, 807XXA

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s).

Steve Gredell (Full Name) (Signature) Acting Director of Quality Assurance (Position)

San Ramon, California (Place) August 2, 2002 (Date)

Two simpler commands are also based on the FBUF function code:

Syntax:	FBUF [DUMP or OFF]	
	[DUMP] stops the data measurement and buffering, and prepares to return the data taken so far to the host, even if fewer than the requested number of measurements have been taken. The requested number of measurements are still returned to the host (the extra measurements beyond those actually taken are represented by the number -300.00) [OFF] causes the 8650A to exit the fast buffered mode. All unread data is lost	
Example:	OUTPUT 713;FBUF DUMP	! STOP MEASUREMENT AND BUFFERING
Example 2:	OUTPUT 713;FBUF OFF	! EXIT THE FAST BUFFERED MODE

3.17.3.1 Fast Buffered Mode Speed Notes

The fast buffered mode is the fastest method of collecting measurement data. Top speed in the fast buffered mode is achieved by using a low averaging number (≤4), the POST trigger mode, and no time delay between measurements.

The POST trigger mode is faster than the PRE trigger mode because in the latter mode the 8650A must check for a trigger between each measurement. In the POST mode, the 8650A is in freerun operation after the trigger is received.

After issuing the Fast Buffered command, allow for the 8650A to set up in Fast Buffered mode before issuing a TTL or GET (Group Executable Trigger). Typical delay may vary from 200 msec to 500 msec based on the number of samples to be collected.

3.17.4 Swift Mode

Swift mode is a fast mode which allows for fast continuous data taking and return of each measurement to the host as it is taken (the freerun mode). Swift mode also allows for triggered buffered measurements, in which a host or external trigger indicates when to take each measurement.

The swift mode cannot be entered if a modulated measurement (MAP, PAP or BAP) is being performed.

Commands related to the swift mode are based on the SWIFT function code:

Syntax:	SWIFT [FREERUN or OFF]	
	[FREERUN] initiates the freerun mode (continuous taking and returning of measurements) [OFF] causes the 8650A to exit the swift mode; all unread data is lost	
Example:	OUTPUT 713;SWIFT FREERUN	! INITIATE SWIFT FREERUN MODE
Example 2:	OUTPUT 713;SWIFT OFF	! EXIT THE SWIFT MODE

For commands which set up triggered measurements, the command format is:

Syntax:	SWIFT [GET or TTL] BUFFER [b]	
	[GET or TTL] define the trigger: [GET] the expected trigger is a GPIB GET command. The 8650A signals the host by asserting SRQ every time it is ready to take a measurement [TTL] the expected trigger is a TTL high at the rear panel trigger input BUFFER (followed by the numeric variable [b]) specifies the number of measurements to be taken and stored in the buffer. The minimum value is one. The maximum value is 5000	
Example:	OUTPUT 713;SWIFT GET BUFFER 200	! TAKE MEASUREMENTS UNTIL GET IS RECEIVED ! THEN OUTPUT THE LAST 200 MEASUREMENTS ! TAKEN
Example 2:	OUTPUT 713;SWIFT TTL BUFFER 200	! WAIT FOR A TTL TRIGGER, THEN TAKE 100 ! MEASUREMENTS

Offset

Select this option to enter an offset value in dB when an attenuator or amplifier is installed before the sensor input. From the Sensor Setup menu.

1. Press *[Offset]* and enter the value of the offset with the cursor keys.
2. Press *[OK]* to store the changes, or *[Cancel]* to exit without saving changes.

Config

This option is available with Peak and Modulation sensors only.

Peak Sensors

1. From the Sensor Setup menu select the Peak sensor with the cursor keys.
2. Press *[Config]* to display the Setup Mode menu. This menu offers two options: *CW* and *Peak*.
3. Press *[CW]* to select the CW mode for the peak sensor. There is no configuration for peak sensors operating in the CW mode and the screen will return to the Setup Menu to configure other sensors.
4. Press *[Trig Level]* to configure the trigger level in either the Internal or External Trigger mode.

a. Internal Trigger

Peak power will be sampled at a point defined by a Trigger Level, a Delay, and a Delay Offset. The delay-offset feature is a convenience in some applications (For example, when measuring pulse width from a point other than the trigger level, or when comparing the levels of various pulses within a pulse train).

1.) Press *[Int/Ext Trig]* to select Internal Triggering.

2.) Set the Trigger Level value with the cursor keys.

3.) Press *[Delay]* and use the cursor keys to adjust the Trigger Delay (0 to 100 ms). Units will change automatically.

4.) Press *[Delay Offset]* and use the cursor keys to adjust the Trigger Delay Offset (0 to 100 ms). Units will change automatically.

5.) Press *[OK]* to store the changes, or *[Cancel]* to exit without saving changes.

b. External Trigger

The External Trigger mode is configured the same as the Internal Trigger mode described above, except that the Trigger Level is specified in volts rather than dBm.

1.) Press *[Int/Ext]* Trig to toggle to the External Trigger mode and set the Trigger Level value in volts with the cursor keys.

2.) Press *[OK]* to store the changes, or *[Cancel]* to exit without saving changes.

Modulation Sensors

Modulation sensors can be used in CW, Modulated Average Power (MAP), Peak Average Power (PAP) and Burst Average Power (BAP) modes.

1. From the Sensor Setup menu select the Modulation sensor with the cursor keys.
2. Press *[Config]* to select and configure a modulation sensor. The options for this configuration are CW, MAP, PAP, and BAP.
    a. Press *[CW]* to select the CW mode. There is no configuration for modulation sensors operating in the CW mode and the screen will return to the Setup Menu to configure other sensors.
    b. Press *[MAP]* to select the MAP mode. There is no configuration required and the screen will return to the Setup Menu to configure other sensors.
    c. Press *[PAP]* to select the PAP mode. A prompting will occur to enter a duty cycle for pulse average inputs. Use the cursor keys to adjust the Duty Cycle. The range is 0.001% to 99.999%.
    d. Press *[BAP]* to select the BAP mode. The options are Auto Config and User Config.
        1.) Press *[Auto Config]* for the meter to automatically configure itself and return to the Setup Menu.
        2.) Press *[User Config]* to configure the meter manually. A prompting will occur to enter the values for the *Burst Start Exclude*, *Burst End Exclude* and *Dropout*. Enter these values by pressing the corresponding softkey and using the cursor keys to change the values.

Press *[OK]* to store the changes, or *[Cancel]* to exit without saving changes, and return to the Sensor Setup menu to configure the next sensor, or return to the Main menu.

☛ ***NOTE:*** *Operating the 8651/8652A Universal Power Meters with the 80701A Sensors in a high level RF Field (Approximately 3 V/m) may degrade performance. This degradation occurs at measured levels below –30 dBm and when the frequency of the field is nominally between 100 and 200 MHz.*