Excerpted from Document # 14508-201 Rev A

Operating Manual

6602 Pulse Distribution

datum

Timing, Test & Measurement

Copyright Notice

COPYRIGHT 2001 DATUM - TT&M ALL RIGHTS RESERVED

This manual is provided to assist the user in the operation and maintenance of the supplied equipment or software. It is recognized that multiple copies may be required to support even a single unit, and for this reason, permission is hereby granted to reproduce the supplied User's Guide for the purpose stated above, provided that this notice is included as part of the copy. Additional copies are also available from Datum - TT&M for a nominal fee.

In no case, however, does the supply of this manual or the granting of rights to reproduce the manual, grant any rights to use information contained within to reproduce the supplied equipment or software, either in whole or in part.

The equipment or software described in this manual have been developed solely at the expense of Datum - TT&M and are proprietary. No unlimited rights in technical data are granted. Limited rights as per DFARS 252.227-7013 shall be effective for 10 years from the copyright date.

TABLE OF CONTENTS

6602 Pulse Distribution

Chapter One

INTRODUCTION/PRODUCT OVERVIEW

This Operating Manual contains procedures and descriptive information for proper installation and operation of the Datum 6602 Pulse Distribution.

NOTE …

The 6602 is built in one of two chassis configurations: 6602A or 6602B. The 6602A is the original chassis design, which is superceded by the 6602B chassis. They are functionally identical in every way except for the ALARM OVERRIDE switch that appears on the front panel of the 6602A. This switch is optional for the 6602B, and is located on the rear panel when it is furnished.

The Datum 6602 Pulse Distribution takes a single output signal of a pulse source and provides additional buffered outputs, ten per module.

OPERATOR MANUAL SUMMARY

This Operating Manual is divided into the following chapters:

A. CHAPTER ONE – INTRODUCTION/PRODUCT OVERVIEW

This chapter includes a general description of the Datum 6602 and provides some basic product information.

B. CHAPTER TWO – INSTALLATION

Provides initial inspection and installation information.

C. CHAPTER THREE - OPERATION

Provides information on the use of the switches and indicators.

D. CHAPTER FOUR – SPECIFICATIONS

Provides detailed specifications for the Datum 6602.

PURPOSE OF EQUIPMENT

The Datum 6602 Pulse Distribution uses Datum's high performance distribution technology created for its line of cesium standards. The 1U (1.75" high) chassis houses a set of very low noise and high isolation RF amplifiers. Up to ten Datum 6602 Pulse Distribution modules may be daisy chained to provide up to 100 independently buffered outputs of the common input. The level of the input signal and all ten output signals are monitored, providing a visual indicator of signal presence as well as a summary fault (form-C relay) for each module.

INSTRUMENT IDENTIFICATION

The model number 6602 may be followed by a slash (/) and a three-digit number to indicate an option that is supplied within the instrument.

PREPARATION FOR SHIPMENT

To turn off the Datum 6602 prior to shipment, remove the AC power from the plug on the rear panel. Package the instrument in its original packing if possible. If the original packing materials are not available, pack in a reinforced cardboard carton using foam to take up any space inside the carton. Do not use foam popcorn or crushed paper for packing.

If the instrument is being returned to Datum, contact the Service Department at 1-800-938-9888 for product return information.

TYPOGRAPHICAL AND OTHER CONVENTIONS

This Operating Manual uses the following conventions:

Acronyms and Abbreviations – Terms are spelled out the first time they appear in this Operating Manual. Thereafter, only the acronym or abbreviation is used. In addition, the glossary defines the acronyms and abbreviations.

Revision Control – The title page lists the printing date and part number of this Operating Manual. Table 1-1 describes the typographical conventions that this Operating Manual uses to distinguish between the different types of information according to how they are used.

TABLE 1-1. TYPOGRAPHICAL CONVENTIONS

WHEN TEXT APPEARS THIS WAY ...	IT MEANS ...
Datum 6602 Operating Manual	The title of a document or the name of a product
CRITICAL PORT-1 J1	An operating mode, alarm state, status, or chassis label.
Press the **Enter** key. Press the **Print Scrn** key.	A named keyboard key. The key name is shown as it appears on the keyboard. An explanation of the key's acronym or function immediately follows the first reference to the key, if required.
A *re-timing* application ...	A term or a word being emphasized.
Datum **does not** recommend ...	A word or term given special emphasis so that you do not miss the idea being presented.

WARNINGS, CAUTIONS, RECOMMENDATIONS, AND NOTES

Warnings, Cautions, Recommendations, and Notes attract attention to essential or critical information in this Operating Manual. The types of information included in each are explained as follows:

WARNING …

All warnings have this symbol. Do not disregard warnings. They are installation, operation, or maintenance procedures, practices, or statements that if not strictly observed, may result in personal injury or loss of life.

ELECTRICAL SHOCK HAZARD …

All electrical shock hazard warnings have this symbol. To avoid serious personal injury or death, do not disregard electrical shock hazard warnings. They are installation, operation, or maintenance procedures, practices, or statements that if not strictly observed, may result in personal injury or loss of life.

CAUTION …

All cautions have this symbol. Do not disregard cautions. They are installation, operation, or maintenance procedures, practices, conditions, or statements that if not strictly observed, may result in damage to or destruction of equipment or may cause a long-term health hazard.

CAUTION …

All Electrostatic Discharge (ESD) cautions have this symbol. They are installation, operation, or maintenance procedures, practices, conditions, or statements that if not strictly observed, may result in electrostatic discharge damage to, or destruction of, static sensitive components of the equipment.

RECOMMENDATION …

All recommendations have this symbol. Recommendations indicate manufacturer-tested methods or known functionality. They contain installation, operation, or maintenance procedures, practices, conditions, or statements that provide you with important information for optimum performance results.

NOTE …

All notes have this symbol. Notes contain installation, operation, or maintenance procedures, practices, conditions, or statements that alert you to important information which may make your task easier or increase your understanding.

WHERE TO FIND ANSWERS TO PRODUCT AND DOCUMENT QUESTIONS

If you believe that this product is not performing as expected, or if you have comments about this Operating Manual, please contact your Datum representative or sales office

We appreciate your suggestions on ways to improve this Operating Manual. Please mark or write your suggestions on a copy of the page and mail or fax it to …

Datum – Timing, Test & Measurement
34 Tozer Road
Beverly, MA 01915-5510
US Toll Free: 1-800-938-9888
Phone: +1-978-927-8220
Fax: +1-978-927-4099
E-mail: ttmsales@datum.com

Thank you for providing the information.

NOTE …

Datum offers a number of applicable training courses designed to enhance product usability. Contact your Datum representative or sales office for a complete list of courses and outlines.

Chapter Two

INSTALLATION

MOUNTING

The Datum 6602 is designed to be mounted in a standard 19-inch equipment rack and take up 1 U of vertical space (1.75"). The chassis depth is 10 inches.

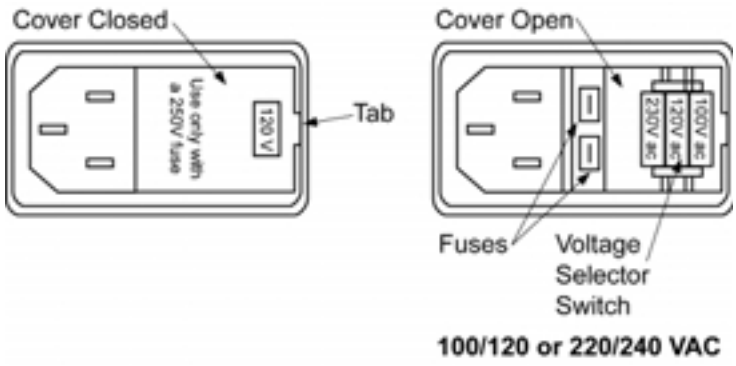
CAUTION …

Do not install the Datum 6602 in a rack without support under the chassis. If the front panel is merely attached to the front rails of the rack, the panel will warp and eventually break.

POWER CONNECTION/FUSES/VOLTAGE SELECTION

The Datum 6602 is powered from an AC source by a detachable power supply cord. The power cord is the disconnect device. Refer to Chapter Four for power supply requirements. The AC fuses are located inside the AC connector/filter. The hot and neutral lines are fused separately. To change fuses, refer to Figure 2-1. Open the cover on the AC connector/filter by applying a screwdriver to the cover slot. Once the cover is open, each fuse holder may be removed for inspection or replacement. Replace only with a 0.2A, 250V as specified in Chapter Four.

Figure 2-1. AC Input Filter/Fuses/Voltage Selector



The Datum 6602 may be powered from 120 or 240 VAC. To change the AC input between 120 and 240 VAC, refer to Figure 2-1. Open the cover on the AC input connector by applying a screwdriver to the cover slot. Once the cover is open, a selector switch may be rolled left or right to line up "120" or "240" with the small window in the connector cover. Replace the cover on the AC input connector by snapping in place.

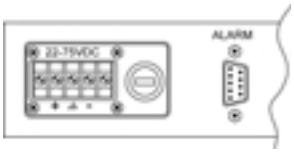
CAUTION …

Do not use the voltages labeled "100" or "230", as they are not connected.

DC POWER CONNECTION

The Datum 6502 (DC version) is powered from a DC source. The connections are made at TB1 as shown in Figure 2-2. The voltage input may be 22 V to 56 V.

Figure 2-2. DC Power Connection

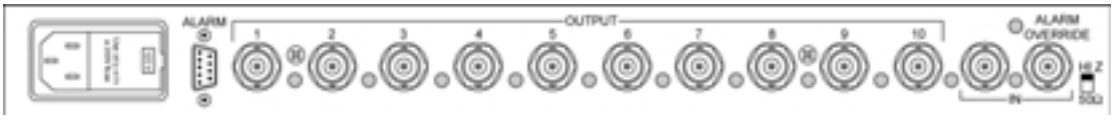


SIGNAL CONNECTIONS

Connect the signal to be distributed to one of the two D connectors labeled INPUT. Set the impedance switch to 50Ω (down) if only one 6602 module is to be used. If multiple 6602 modules are used to obtain more than twelve outputs, see Figure 2-4.

Output cables may be connected in any order to the BNC connectors labeled 1 to 10. Refer to Figure 2-3.

Figure 2-3. Signal Connections

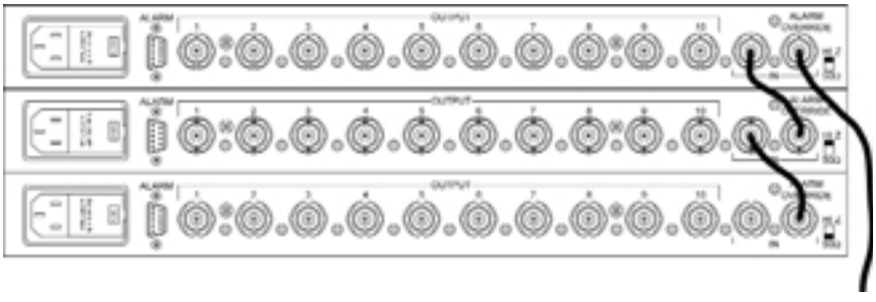


With the 6602 powered, the green power indicator on the front panel will illuminate. The impedance switch should be set to 50Ω if there is only one module. The red indicator next to the input signal is off to show that there is a good input signal.

DAISY-CHAINING MORE THAN ONE MODULE

If more than ten outputs are required, up to ten Datum 6602 modules can be driven by a common input signal to produce up to 100 outputs. Figure 2-4 illustrates this connection.

Figure 2-4. Daisy-Chaining Multiple Modules

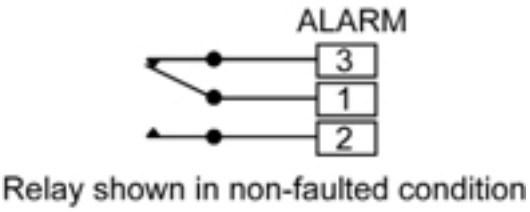


The example in Figure 2-4 shows three units. The original signal from the source is connected to the IN connector on the right side of the first module. The left IN connector on the first module is connected to the right IN connector on the second module. The second module is connected to the third module in the same fashion. The impedance switch for the first and second chassis is set to HI Z, while the impedance switch on the third (or last) chassis in the daisy chain is set to 50Ω.

ALARM CONNECTIONS

The Datum 6602 provides for an alarm to signal the failure of any signal output. One set of form-C relay contacts is provided on the 9-pin D connector labeled ALARMS. For normal operation, pins 1-2 are open and pins 1-3 are closed. The sense is reversed for a fault condition. Refer to Figure 2-5.

Figure 2-5. Alarm Contacts



If the input signal or input buffer fails or falls below the factory-set low-level threshold, the red fault indicator next to the input connector will turn on. Likewise, if any output buffer fails or falls below the low-level threshold, a red fault indicator next to that output will turn on. The ALARM form-C relay is normally energized, indicating no signal failure. If either the input or any output signal fails, the relay is deenergized (short between pins 1 and 2), indicating a fault condition. This is a failsafe design that will indicate a fault in the event of a power loss.

Chapter Three

OPERATION

The Datum 6602 Pulse Distribution controls and indicators are described in this chapter. Two chassis configurations are described, the 6602A and the 6602B. The only difference between the two chassis configurations is that the ALARM OVERRIDE switch is optional for the 6602B, and when it is furnished with the 6602B it is located on the rear panel.

FIGURE 3-1A. 6602A PULSE DISTRIBUTION FRONT PANEL

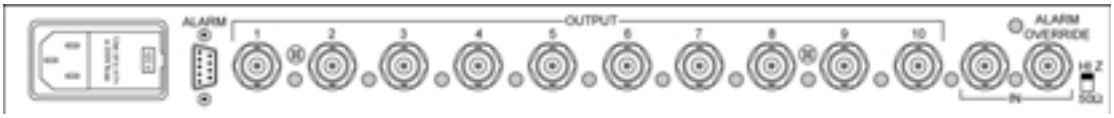


FIGURE 3-2A. 6602A PULSE DISTRIBUTION REAR PANEL

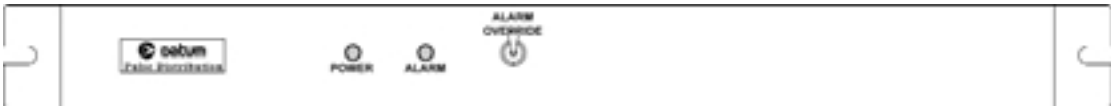
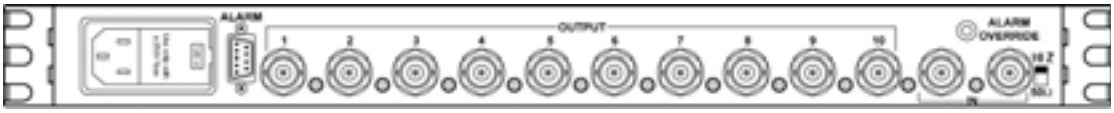


FIGURE 3-1B. 6602B PULSE DISTRIBUTION FRONT PANEL

FIGURE 3-2B. 6602B PULSE DISTRIBUTION REAR PANEL



HI Z/50Ω – This slide switch on the rear panel selects either the HI Z input impedance (unterminated) or the 50Ω input impedance. A 6602 installation of two or more (ten maximum) units will require the switch to be set to the HI Z position on the module connected to the source of the signal, and on all subsequent modules except the last module, which is switched to the 50Ω position, providing proper termination for the signal.

ALARM OVERRIDE – The toggle switch on the front panel of the 6602A enables or disables the ALARM relay, which is output via the ALARM connector on the rear panel. When the switch is in the UP position, the ALARM relay is enabled, and will switch states in the event of a signal failure. Placing the switch in the down position will force the ALARM relay to the normal (no alarm) condition. The purpose of this switch is to allow an audible alarm to be shut off. This switch does not affect any of the LED indications.

An optional ALARM OVERRIDE switch may be ordered with the 6602B configuration. The optional toggle switch will be located on the rear panel above the "IN" connectors.

POWER – LED on the front panel to indicate that power is applied. There is no power switch on the 6602. When power is connected, power is ON.

ALARM – LED on the front panel to indicate that an ALARM condition exists. An alarm condition exists when the input signal or any output signal fails or falls below the factory preset amplitude.

INPUT FAULT – LED located on the rear panel between the two INPUT connectors. If the input signal fails or falls below the factory preset amplitude, this LED will light and stay on until the cause of the fault is remedied.

OUTPUT FAULT – LED's located to the right of each output connector. If any output signal fails or falls below the factory preset amplitude, the LED associated with the failed output will light and stay on until the cause of the fault is remedied.

Chapter Four

SPECIFICATIONS

NOTE …

All performance is at an ambient temperature of 25°C unless otherwise specified.

1 PPS INPUT

Repetition Rate	1 PPS
Input Impedance	50Ω
Logic One	+2.7 to 10.0 volts
Logic Zero	+0.0 to 0.8 volts
Pulse Width	20 µs nominal
Rise Time	<5 ns
Fall Time	<5 ns
Connector	BNC

1 PPS OUTPUTS (10)

Repetition Rate	1 PPS
Output Impedance	50Ω
Logic One	+4.5 volts minimum
Logic Zero	+0.8 volts maximum
Pulse Width	20 µs nominal
Rise Time	<5 ns
Fall Time	<5 ns
Propagation Delay	25 ns
Differential Delay	<9ns between any two outputs
Jitter	1 ns rms
Connectors	BNC

POWER

Operating Voltage	120/230 VAC, ±15%, <10 W
DC Input (Optional)	22 to 56 VDC, 10 W

MECHANICAL

Height	1.75" (1 U)
Width	19" (including rack mount ears)
Depth	10"

ENVIRONMENTAL

Operating Temperature	0 to 50°C
Relative Humidity	0 to 95%, non-condensing

ALARM OUTPUT

Summary alarm indicates failure of any output signal.

Each Output & Main	Red LED
Non-alarm Condition	Relay energized (fail safe) Form-C Contacts
Alarm O/P Disable	Front panel switch (6602A only)
Connector	9 pin D-male

CONTROLS AND INDICATORS

POWER	Green LED indicates power is connected		
ALARM	Red LED indicates a signal output failure		
ALARM OVERRIDE	Toggle switch:	UP	= Alarm Enabled
(Optional for 6602B)		DOWN	= Alarm Disabled

NOTE …

If the input signal level is less than 10 dBm, please specify the Low Alarm Threshold version (-509).

Limited Warranty

DATUM - TT&M guarantees its products to be free from defects in material and workmanship for a period of one year from the date of shipment. Datum - TT&M shall, at its option, either repair or replace hardware products which prove to be defective.

DATUM - TT&M software and firmware products designed to be used and installed in Datum - TT&M hardware products are warranted not to fail to execute their programming instructions due to defects in material or workmanship. If Datum - TT&M receives notice of such defects during the warranty period, Datum - TT&M will repair or replace software media and firmware which do not execute their programming instructions due to such defects. Datum - TT&M does not warrant that operation of the software, firmware or hardware shall be uninterrupted or error free.

All warranty service will be carried out at the Datum - TT&M – TT&M facilities at 34 Tozer Rd, Beverly, MA 01915. The purchaser shall prepay shipping charges and shall pay all duties and taxes for products returned for warranty service. Datum - TT&M will pay for the return of products to the purchaser except for products returned from another country.

LIMITATION OF WARRANTY: The above warranty does not apply to defects of, or resulting from the following:

1. End items included as part of a system or product selected by, but not designed by, Datum - TT&M are subject only to warranty as may be obtained from the original manufacturers. Such items include, but are not limited to, test equipment, accessories, batteries, computers, printers, software, etc.
2. Items manufactured by Datum - TT&M pursuant to detailed designs furnished by purchaser or specific components, accessories, support equipment and software specified by purshaser.
3. Improper or inadequate maintenance by purchaser.
4. Unauthorized modifications, misuse or mishandling.
5. Operation outside of the environmental specifications of the product.
6. Purchaser's supplied software or interfacing.

THIS WARRANTY IS EXCLUSIVE AND NO OTHER WARRANTY, WHETHER WRITTEN OR ORAL, IS EXPRESSED OR IMPLIED. DATUM - TT&M SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

The remedies set forth above are the purchaser's sole and exclusive remedies. In no circumstances shall Datum - TT&M assume liability for loss, damage, or consequential expense (including loss of profits) whether based on contract, tort, or any other legal theory, arising directly or indirectly from the use of its equipment separately or in combination with other equipment.