MODEL 8185 TIMEBURST™
MODEL 8186 TIMEBRIDGE™
SYSTEM MANUAL

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REVISIONS, IF ANY, ARE LOCATED AT THE END OF THE MANUAL

REVISION A
December 2003

SPECTRACOM
PUBLIC SAFETY | SECURITY | GOVERNMENT

5-Year Warranty

LIMITED WARRANTY

Spectracom warrants each new product manufactured and sold by it to be free from defects in material, workmanship, and construction, except for batteries, fuses, or other material normally consumed in operation that may be contained therein, for five years after shipment to the original purchaser (which period is referred to as the "warranty period"). This warranty shall not apply if the product is used contrary to the instructions in its manual or is otherwise subjected to misuse, abnormal operations, accident, lightning or transient surge, repairs or modifications not performed by Spectracom.

The GPS receiver is warranted for one year from date of shipment and subject to the exceptions listed above. The power adaptor, if supplied, is warranted for one year from date of shipment and subject to the exceptions listed above.

The Rubidium oscillator, if supplied, is warranted for two years from date of shipment and subject to the exceptions listed above.

All other items and pieces of equipment not specified above, including the antenna unit, antenna surge suppressor and antenna pre-amplifier are warranted for 5 years, subject to the exceptions listed above.

WARRANTY CLAIMS

Spectracom's obligation under this warranty is limited to in-factory service and repair, at Spectracom's option, of the product or the component thereof, which is found to be defective. If in Spectracom's judgment the defective condition in a Spectracom product is for a cause listed above for which Spectracom is not responsible, Spectracom will make the repairs or replacement of components and charge its then current price, which buyer agrees to pay.

Spectracom shall not have any warranty obligations if the procedure for warranty claims is not followed. Users must notify Spectracom of the claim with full information as to the claimed defect. Spectracom products shall not be returned unless a return authorization number is issued by Spectracom. Spectracom products must be returned with the description of the claimed defect and identification of the individual to be contacted if additional information is needed. Spectracom products must be returned properly packed with transportation charges prepaid.

EXCEPT FOR THE LIMITED WARRANTY STATED ABOVE, SPECTRACOM DISCLAIMS ALL WARRANTIES OF ANY KIND WITH REGARD TO SPECTRACOM PRODUCTS OR OTHER MATERIALS PROVIDED BY SPECTRACOM, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTY OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Spectracom shall have no liability or responsibility to the original customer or any other party with respect to any liability, loss, or damage caused directly or indirectly by an Spectracom product, material, or software sold or provided by Spectracom, replacement parts or units, or services provided, including but not limited to any interruption of service, excess charges resulting from malfunctions of hardware or software, loss of business or anticipatory profits resulting from the use or operation of the Spectracom product or software, whatsoever or howsoever caused. In no event shall Spectracom be liable for any direct, indirect, special or consequential damages whether the claims are grounded in contract, tort (including negligence), or strict liability.

EXTENDED WARRANTY COVERAGE

Extended warranties can be purchased for additional periods beyond the standard five-year warranty. Contact Spectracom no later than the last year of the standard five-year warranty for extended coverage.

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SECTION 1 GENERAL INFORMATION

GENERAL INFORMATION

1.0 UNPACKING

Carefully examine cartons and contents as soon as you receive your TimeBurst and TimeBridge units. If there is damage to a carton resulting in damage to a unit, contact your carrier immediately so their representative may witness the damage. Failing to report shipping damage immediately may forfeit any claim you might have against the carrier. In addition, please notify Spectracom Corporation of shipping damage to obtain a replacement or repair services. Our phone and fax numbers are on the first page of this manual.

Remove the packing list from the envelope on the outside of the carton and carefully open the shipping carton. Check the packing list against the contents to be sure you have received all items, including an instruction manual and ancillary kit for each unit. Table 1-1 lists the items included in the TimeBurst ancillary kit. Table 1-2 shows the items in the TimeBridge ancillary kit.

Each TimeBurst and TimeBridge includes a power adapter. Standard units, receive an AC power wall adapter, part number T00058. Units ordered with an international power supply (Option 1), receive a tabletop adapter, part number PS00142.

If possible, you should save this original packing material to use in the event that this equipment needs to be returned to Spectracom for repair or updating.

Description	Part Number	Quantity
Terminal Block, 3-position	P13003	2
Terminal Block, 4-position	P13104	1
Terminal Block, 8-position	P13008	1
6-32 screw, 7/16”	H04070	1
#6 Split lockwasher	H06001	1
#6 Flat washer	H06002	1
Cable Clamp	MP00719	1

TABLE 1-1 MODEL 8185 TIMEBURST ANCILLARY KIT

Description	Part Number	Quantity
Terminal Block, 3-position	P13003	1
Terminal Block, 4-position	P13104	1
Terminal Block, 5-position	P13005	1

TABLE 1-2 MODEL 8186 TIMEBRIDGE ANCILLARY KIT

1.1 SYSTEM INTRODUCTION

The Spectracom Model 8185 TimeBurst, shown in Figure 1-1, working in conjunction with one or more Spectracom Model 8186 TimeBridge units Figure 1-2, provide precise, traceable time signals. The TimeBurst receives time information from a Spectracom NetClock® Master Clock. This Master Clock receives its timing information from WWVB or the Global Positioning System (GPS) constellation of satellites.

Using your existing radio network, the TimeBurst provides timed communication data bursts to remote TimeBridge units connected to your radio receivers. These time signals are accurate to within 250 milliseconds of Universal Coordinated Time (UTC). This system is ideally suited for applications requiring an accurate and traceable time source. Typical applications include computer network timing, utility billing, financial transactions, public safety and transportation.

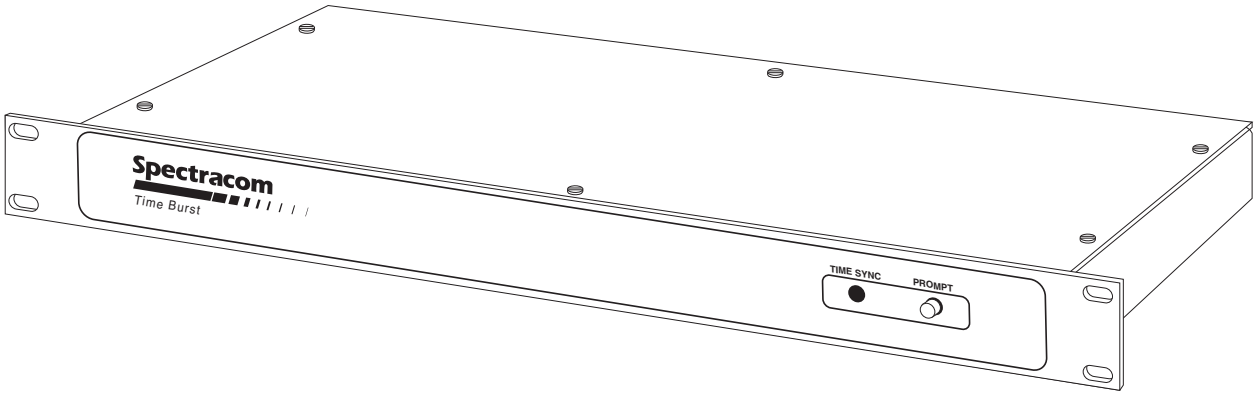


FIGURE 1-1 MODEL 8185 TIMEBURST

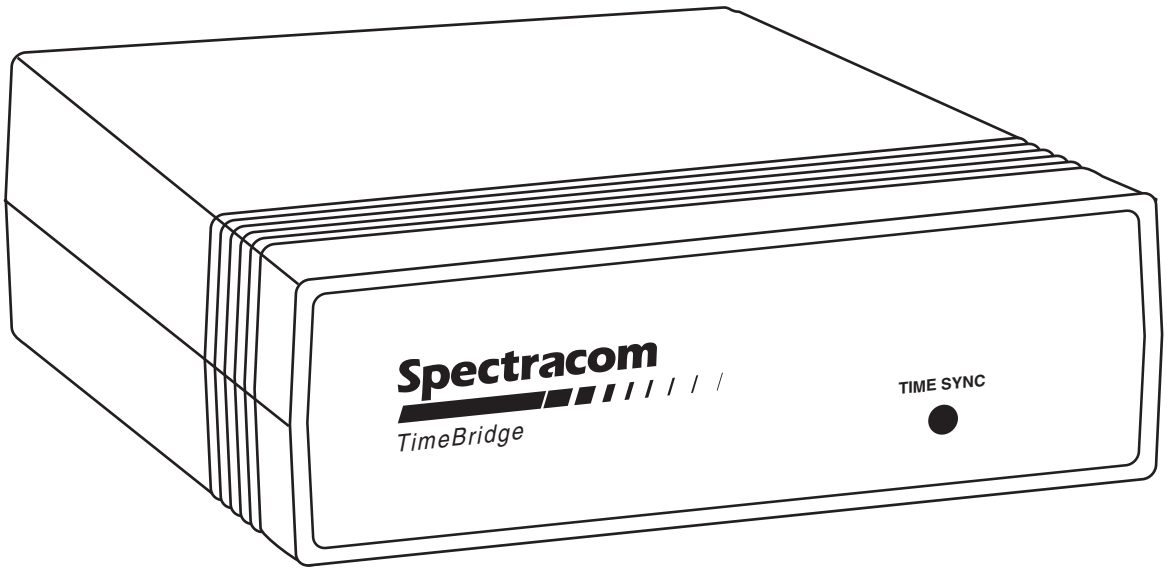


FIGURE 1-2 MODEL 8186 TIMEBRIDGE

1.2 FEATURES

The Spectracom TimeBurst/TimeBridge system offers the following features:

- Reliable world-wide coverage: The TimeBurst will synchronize to a NetClock Master Clock which receives time signals from either WWVB or the Global Positioning System.
- Excellent Accuracy: Time data outputs are accurate to within 250 milliseconds of UTC.
- Versatility: The TimeBurst/TimeBridge system automatically provides synchronized time over existing shared radio channels.
- Programmable Set-up: The TimeBurst can be user-programmed to output to TimeBridge units on a variety of schedules.
- Easy Installation: TimeBurst units feature simple hook-up and standard rack mount design to allow fast integration into your existing time signaling system. TimeBridge units are compact, lightweight, simple to install, and feature just a single front panel operation indicator for simplified use at remote facilities.

1.3 WARRANTY INFORMATION

TimeBurst and TimeBridge units are warranted for five years. Details on the warranty are in the front of this manual. If it is necessary to exercise the warranty, please contact us to obtain a replacement or service.

You will need a Return Material Authorization Number (RMA#) before returning any equipment to us. When you call, please have the serial number ready and a description of the failure symptoms. Transportation to the factory is your responsibility.

1.4 HOW TO CONTACT US FOR PRODUCT SUPPORT

Product support is available in a variety of ways, including telephone, mail and e-mail. Have questions on equipment operation and applications? Please contact us at:

PHONE: 585-321-5800
FAX: 585-321-5819
E-MAIL: techsupport@spectracomcorp.com
WEB PAGE: www.spectracomcorp.com

Our web page contains product information and upgrade notices.

1.5 HAVE SOME FEEDBACK? WE'D LOVE TO HEAR IT!

We continuously try to improve our products and service. How are we doing? If you have any comments, concerns, questions or suggestions please call our Customer Service Department, Monday through Friday from 8:03 AM to 5:00 PM Eastern time.

1.6 MANUAL ERRATA AND SPECIAL DOCUMENTATION

Information concerning manual corrections or changes made to the equipment after printing is found in the Errata section located at the rear of this manual.

Spectracom will make equipment modifications upon special request. The documentation associated with any special is also located in the back of the manual.

SECTION 2 INSTALLATION

INSTALLATION

2.0 INTRODUCTION

This section contains TimeBurst and TimeBridge installation and configuration information. To ensure proper operation, please read this section before using this equipment. Greater technical detail is provided in Section 3 (Operation), Section 4 (Service Port Commands), Appendix B (TimeBurst Specifications) and Appendix C (TimeBridge Specifications).

2.1 OVERALL SYSTEM CONFIGURATION

Figure 2-1 shows the general configuration of the Spectracom TimeBurst/TimeBridge system. The Model 8185 TimeBurst unit is installed between a NetClock Master Clock in the central dispatch facility and the existing radio transceiver. This connection is made using the RS-485 output normally used to supply signals to time devices such as the Spectracom TimeView™ 230, TimeView 400 Wall Clocks, the TimeTap™ RS-485 to RS-232 Converter, or the TimeTalk™ Audio Time of Day Announcer. A pass-through RS-485 connector on the rear of the TimeBurst allows these devices to be reconnected into the rest of the system.

Model 8186 TimeBridge units are installed in remote facilities such as station houses, or in mobile units. The TimeBridge receives the time signal from the TimeBurst through an existing radio system. The rear panel RS-485 output sends this time information to wall clocks or other time devices, while the IRIG output allows the signal to be sent to a voice recorder.

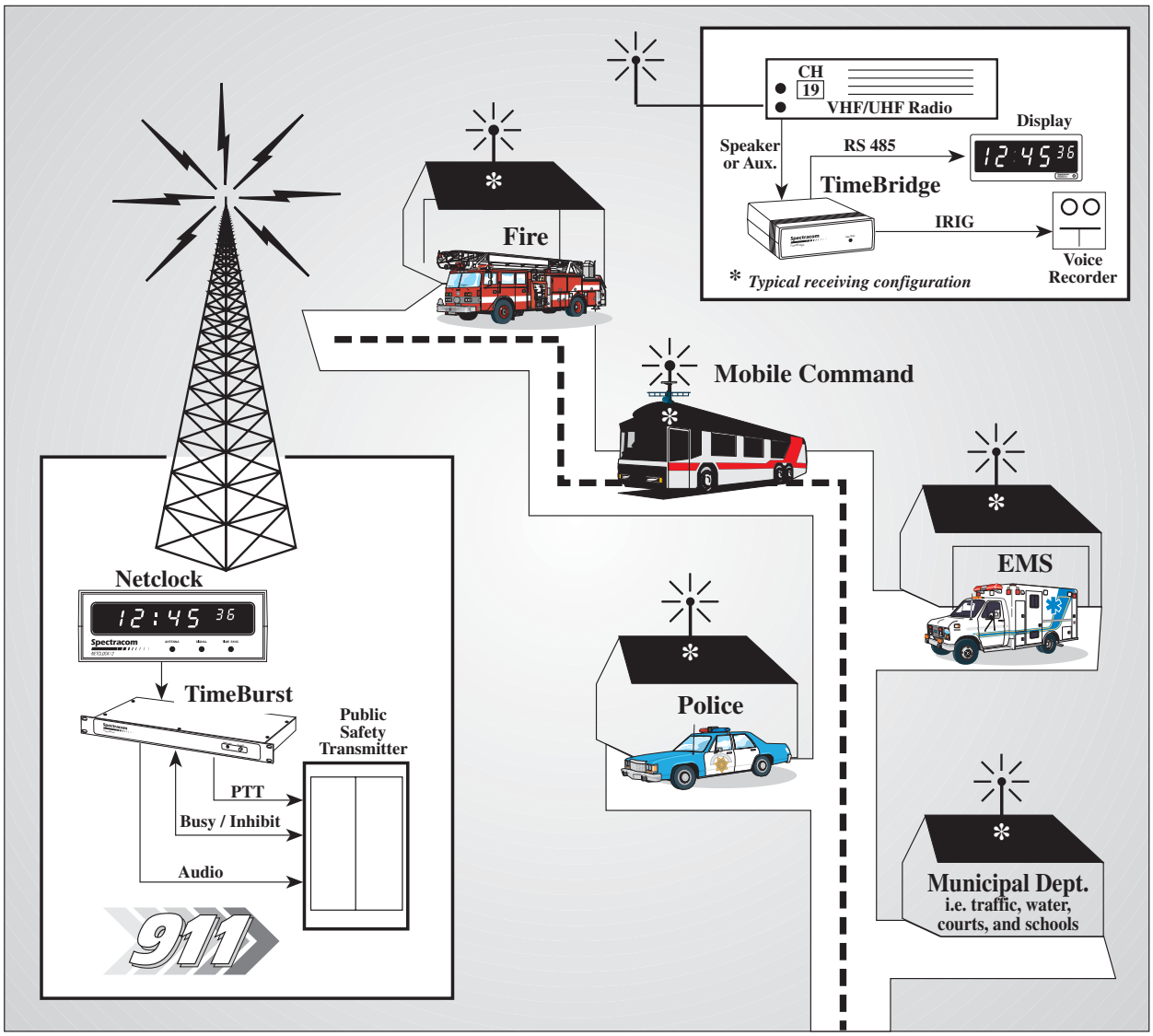


Figure 2-1 TimeBurst/TimeBridge System Configuration

2.2 CONNECTING THE TIMEBURST TO YOUR SYSTEM

A number of inputs, outputs and connections are required to integrate the TimeBurst into your existing time keeping and communications system. All of these are on the rear panel of the instrument. These connections should be made before the unit is permanently installed in a cabinet or rack.

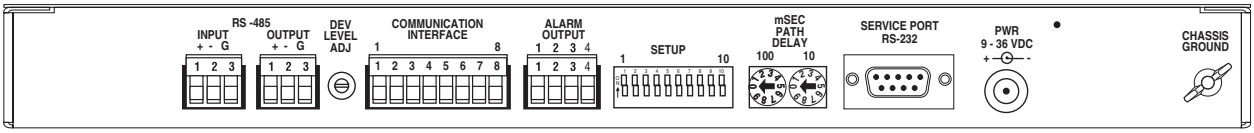


Figure 2-2 Rear Panel Connections - TimeBurst

2.2.1 TIMEBURST COMMUNICATION INTERFACE

The TimeBurst features an integrated analog modem. Control inputs and outputs are available on the connector labeled COMMUNICATIONS INTERFACE as shown in Figures 2-2 and 2-3. This connector requires an 8-pin pluggable terminal block, which is supplied in the Ancillary Kit for the unit. The modem output provides communications over an analog channel having the standard voice grade bandwidth of 300-3000 Hz. The output of the modem is a balanced 600 ohm transformer interface that can be connected to the input of the communications channel. There is a DC blocking capacitor in the circuit. AUDIO HI and LO are to be connected to the 600 ohm audio input of the communications channel. The input can be balanced or unbalanced, since the TimeBurst output is balanced. If the communications channel input impedance is not 600 ohms, please consult the factory.

The control inputs and outputs are BUSY, REMOTE PROMPT and PTT as shown in Figure 2-3. These are available to control the communications activity including radio transmitter control. The PTT output is an optically isolated NPN transistor output that will provide a positive or negative signal. Refer to Section 2.2.6 (TimeBurst Setup DIP switches) for further details. This signal will go active some time before the audio modulation is applied. This time has a default specification of 250 milliseconds, but can be altered using the Front Porch Delay command (FPD). See section 4.10 (FPD Command) for details. The BUSY input is an optically isolated input that will signal the TimeBurst when it is clear to send data. This input can be positive or negative polarity. See section 2.2.6 (TimeBurst Setup DIP switches) for further details. The REMOTE PROMPT input is an optically isolated input that will signal the TimeBurst to send data. This input can be a positive or negative polarity. Also see section 2.2.6 (TimeBurst Setup DIP switches) for further details. This input is used for system operation, initialization and verification. The Remote Prompt is triggered manually with a switch or an electronic signal.

In Figure 2-3 the BUSY, PROMPT, and PTT connections are shown as interface blocks. The details of these blocks are shown in Figures 2-5a-c, 2-6a-b, and 2-7a-b. The communications interface is configured with the use of optically isolated couplers for control and a 600-ohm transformer for modem audio. This isolation eliminates ground currents and other potential problems that are encountered when connecting separate pieces of electronic equipment. The jumper blocks for the controls allow various hookup options. The BUSY and PROMPT inputs allow the optical isolator input diodes to be driven from the high or low side. If high side is utilized, then the source of the driving current will be from the host equipment. If low side is selected, then the host equipment will sink the diode current, but the source of the current can be from the host or TimeBurst. See Figures 2-5 and 2-5a-b for various hookup options. The PTT options will allow the optical isolator transistor to drive the host's input to the low or high side. If the output drives high, then the current can be sourced from the TimeBurst or the host's +B supply. If the output drives low, then the source current will come from the host. See
Figures 2-7 and 2-7a-b for various hookup options. These option blocks provide for common or isolated ground connections between the host and TimeBurst. The common and +B connections are the host's ground and power supply, respectively. These can be used along with the TimeBurst ground and +5 volts to meet most inter-connectivity requirements. Note that there are several jumpers that allow the common signal to be connected to the TimeBurst ground. Even though there are several places to do this, the ground is connected when any of these jumpers are in place.

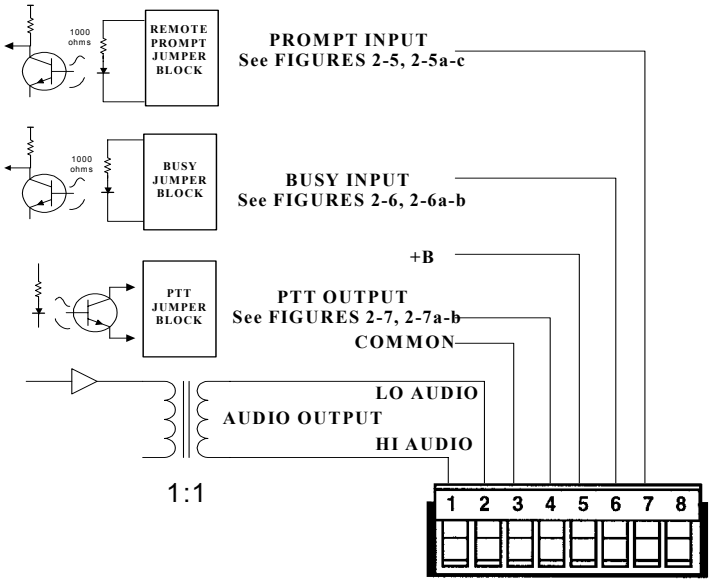


Figure 2-3 Communication Interface Block Diagram

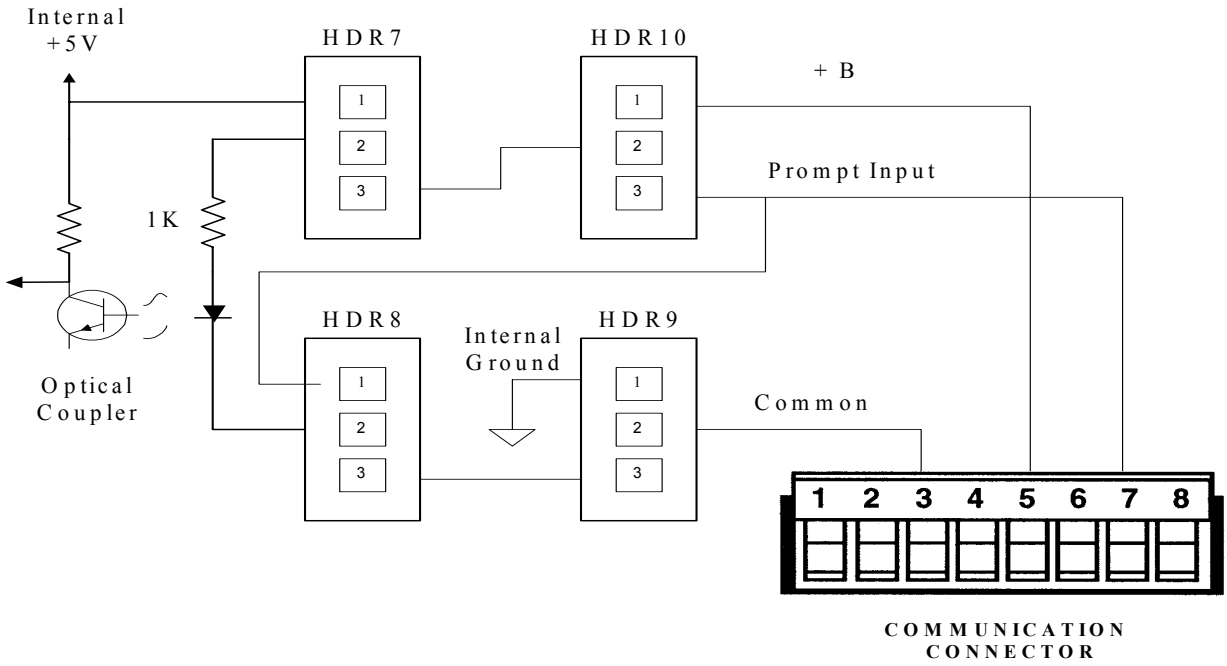


Figure 2-4 Remote Prompt Input Jumper Block

Figure 2-4 above is the jumper block for the Remote Prompt input. This diagram can be used to configure the jumpers. The following figures 2-4a through 2-4c are various hookup options that can be used to implement the Remote Prompt input function. Figure 2-4a shows the configuration if the remote prompt is connected to dry relay or switch contacts or an NPN transistor and is supplied with power from the TimeBurst +5 volt power supply. Figure 2-4b is also for connection to dry relay or switch contacts, but with an external power source. Figure 2-4c is a configuration for use with an external voltage being the activation signal. See the jumper table assignments and DIP switch settings in each of these figures. See Figure 2-7 to locate the jumpers on the printed circuit board.

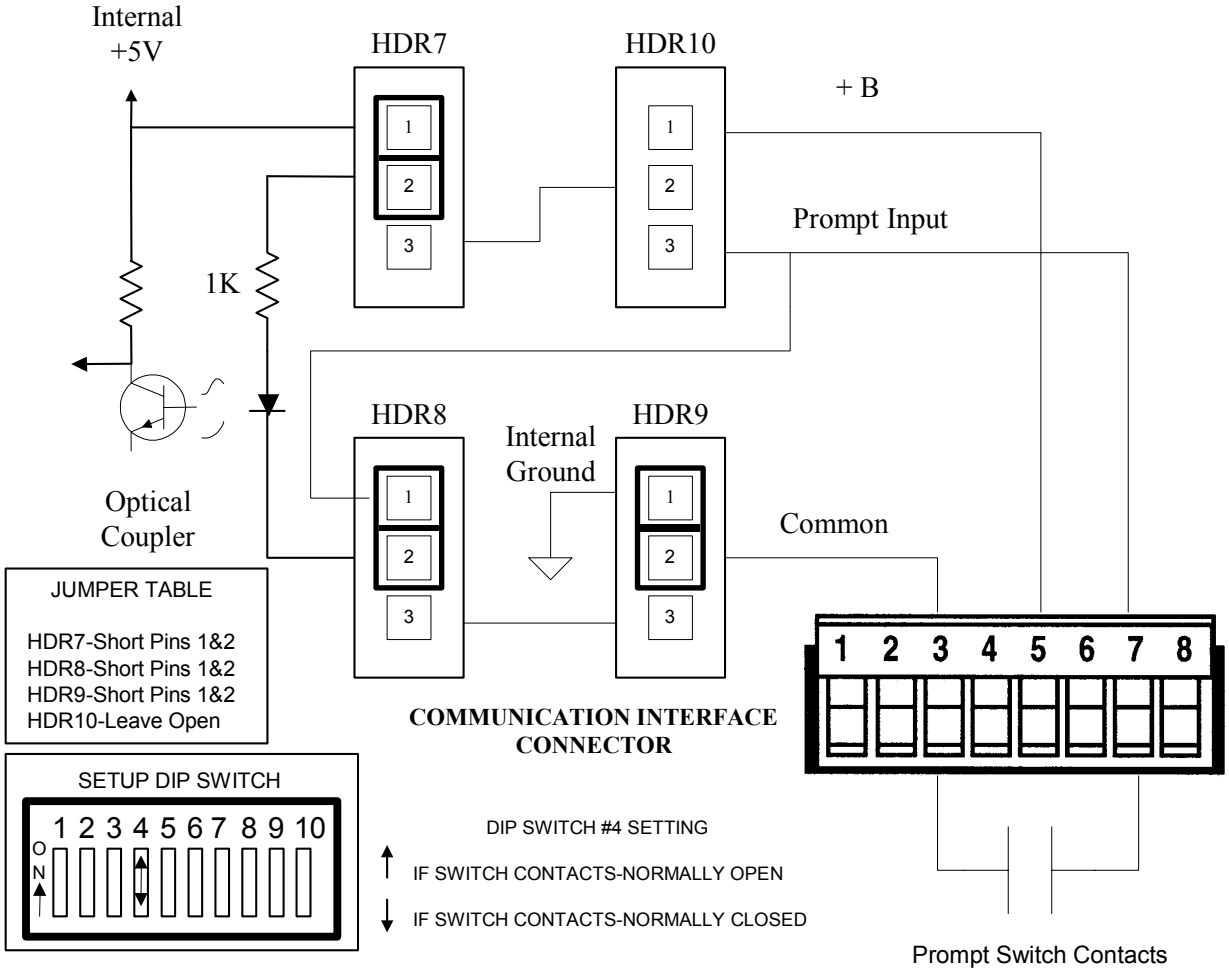


Figure 2-4A **Remote Prompt Input Jumper Block Connection to an Isolated Dry Contact Relay, Switch or NPN Transistor Using TimeBurst Power Supply**

Connect one end of the relay, switch contacts, or the emitter of the NPN transistor to common (pin 3 on Figure 2-4A) and the other end of the relay, switch contact, or the collector of the transistor to the prompt input (pin 7 on Figure 2-4A). Install jumpers and set DIP switch #4 as per Figure 2-4A. Normally closed or normally open contacts can be used. Refer to Figure 2-4A. This circuit uses the +5 volts of the TimeBurst to activate the optical coupler upon contact closure. See section 2.2.6 (TimeBurst Setup DIP switches) for explanation of switch #4 setting. See Figure 2-7 to locate the jumpers on the printed circuit board.

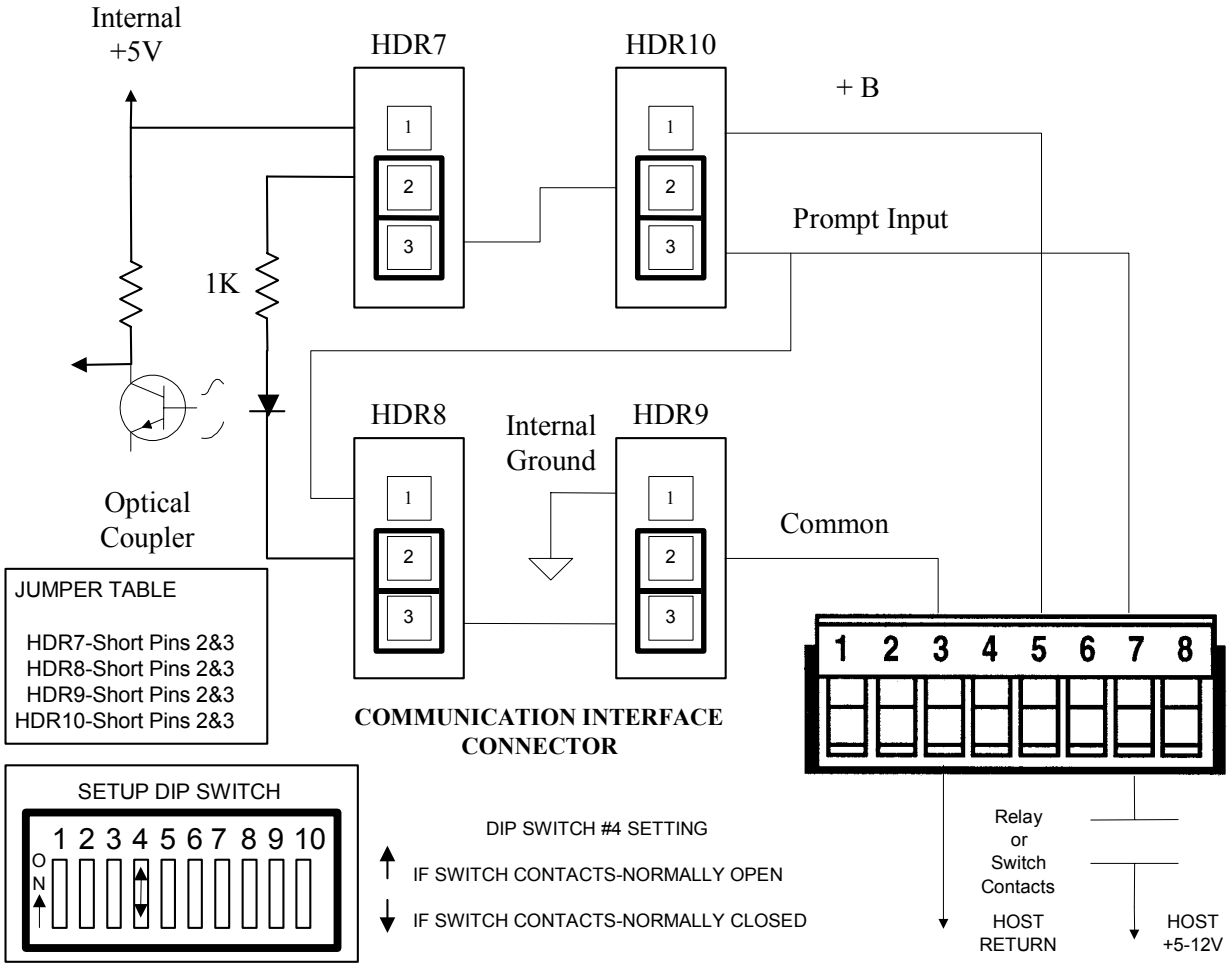


Figure 2-4B Remote Prompt Input Jumper Block Connection to a Dry Contact Switch or Relay Using the Host Power Supply

Connect one end of the Host relay or switch contacts to the pin 7 Figure 2-4B and the Host +polarity voltage to the other end of the relay or switch contacts. Connect pin 3 Figure 2-4B to the Host common. Install jumpers and set DIP switch #4 as per Figure 2-4B. Normally closed or normally open contacts can be used. Refer to Figure 2-4B. This circuit uses the host power to activate the optical coupler when the relay or switch contacts are closed. See Section 2.2.6 (TimeBurst Setup DIP switches) for explanation of Switch #4 setting. See Figure 2-7 to locate the jumpers on the printed circuit board.

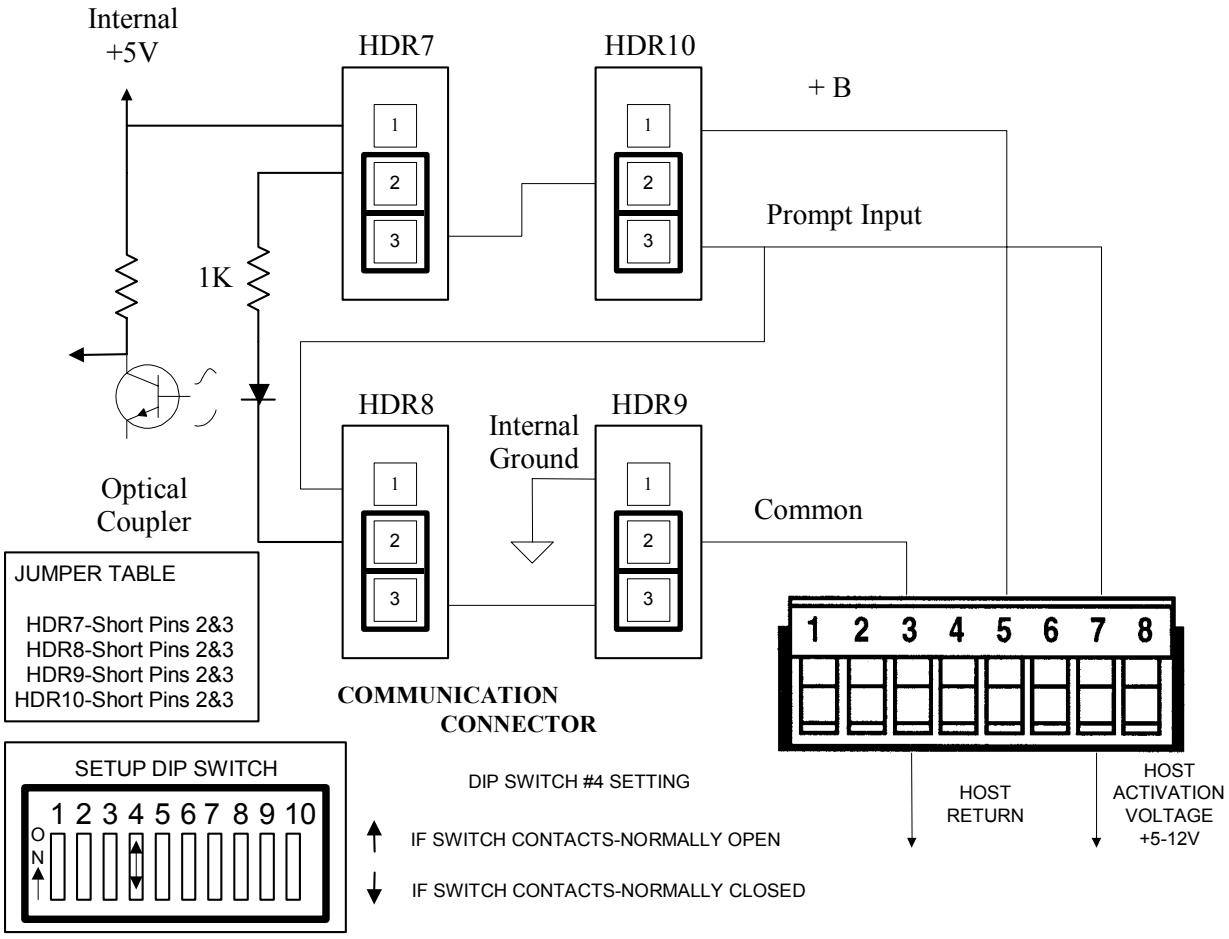


Figure 2-4C Remote Prompt Input Jumper Block Connection to Activation Voltage

Connect the Host activation voltage to Prompt Input pin 7, Figure 2-4C and the Host return to common pin 3, Figure 2-4C. Install jumpers and set DIP switch #4 as per Figure 2-4C. Normally closed or normally open contacts can be used. Refer to Figure 2-4C. This circuit uses the host activation voltage to drive the optical coupler. Refer to Section 2.2.6 (TimeBurst Setup DIP switches) for explanation of Switch #4 setting. See Figure 2-7 to locate the jumpers on the printed circuit board.

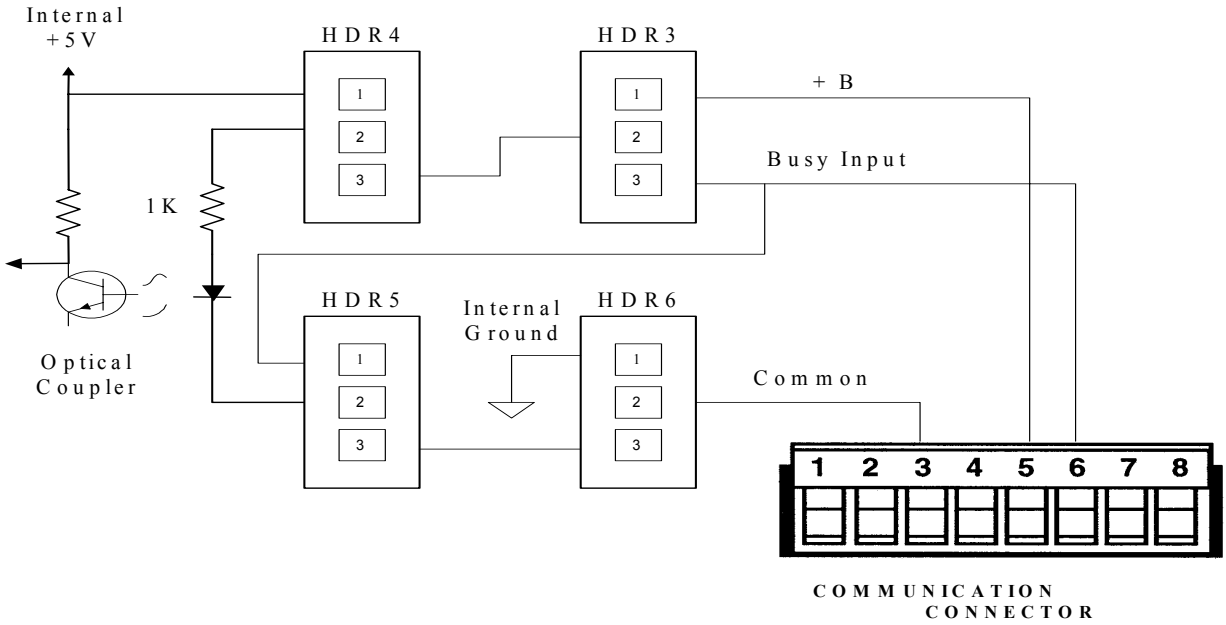


Figure 2-5 Busy Input Jumper Block

Figure 2-5 above is the jumper block for the Busy input. This diagram can be used to configure the jumpers. The following figures 2-5A-B are various hookup options that can be used to implement the Busy input function. Figure 2-5A shows the configuration if the Busy Input is connected to a dry relay or switch contacts and is supplied with power from the Host +5 volt power supply. Figure 2-5B is a configuration for use with an external voltage being the activation signal. See the jumper table assignments and DIP switch settings in each of these figures. See Figure 2-7 to locate the jumpers on the printed circuit board.

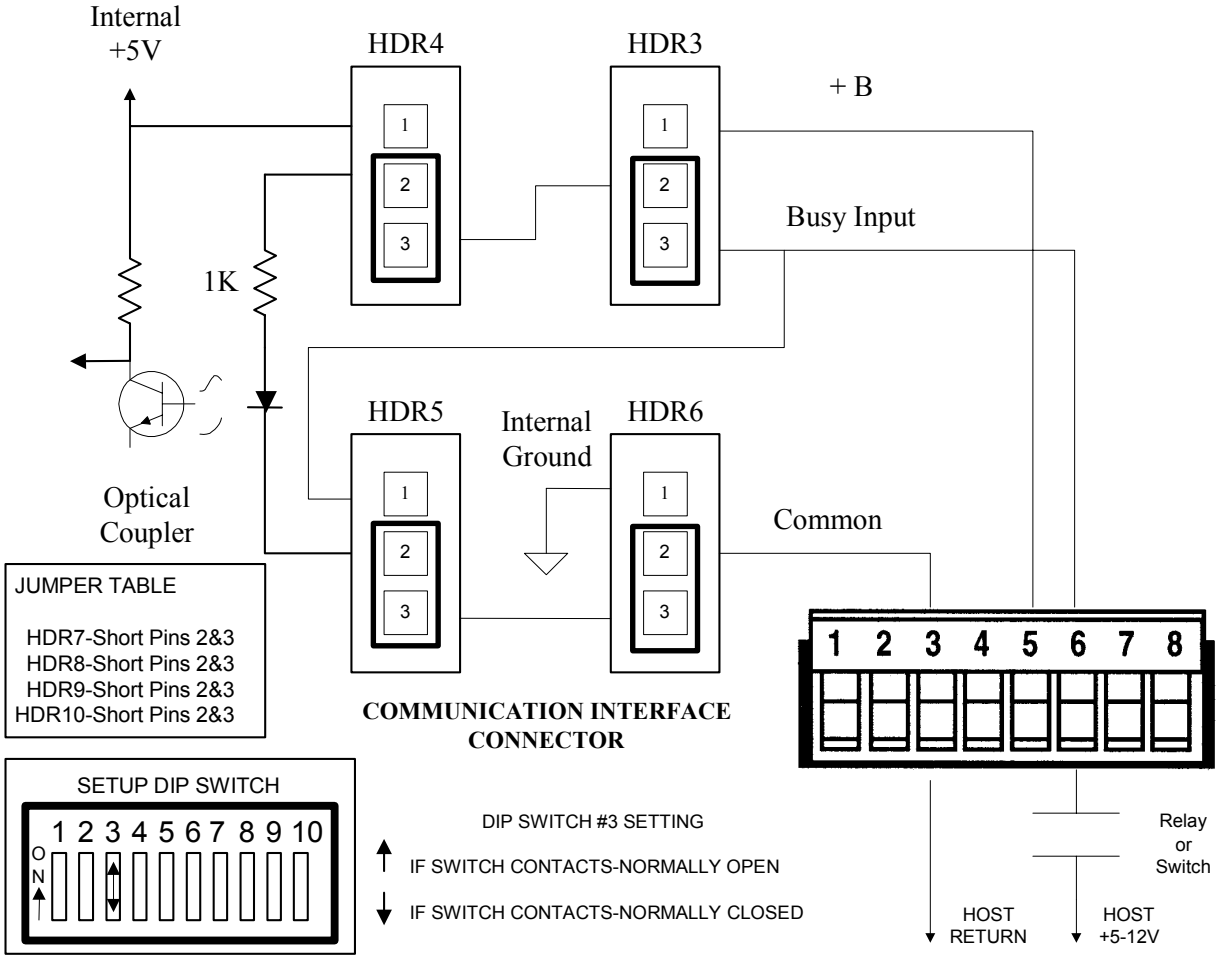


Figure 2-5A Busy Input Jumper Block connection to a dry Contact Switch or relay using the host power supply

Connect one end of the Host relay or switch contacts to the pin 6 Figure 2-5A and the Host +voltage to the other end of the relay or switch contacts. Connect pin 3 Figure 2-5A to the Host common. Install jumpers and set DIP switch #3 as per Figure 2-5A. Normally closed or normally open contacts can be used. Refer to Figure 2-5A. This circuit uses the host power to supply current to activate the optical coupler when the relay or switch contacts are closed. See Section 2.2.6 (TimeBurst Setup DIP switches) for explanation of Switch #3 setting. Refer to Figure 2-7 to locate the jumpers on the printed circuit board.

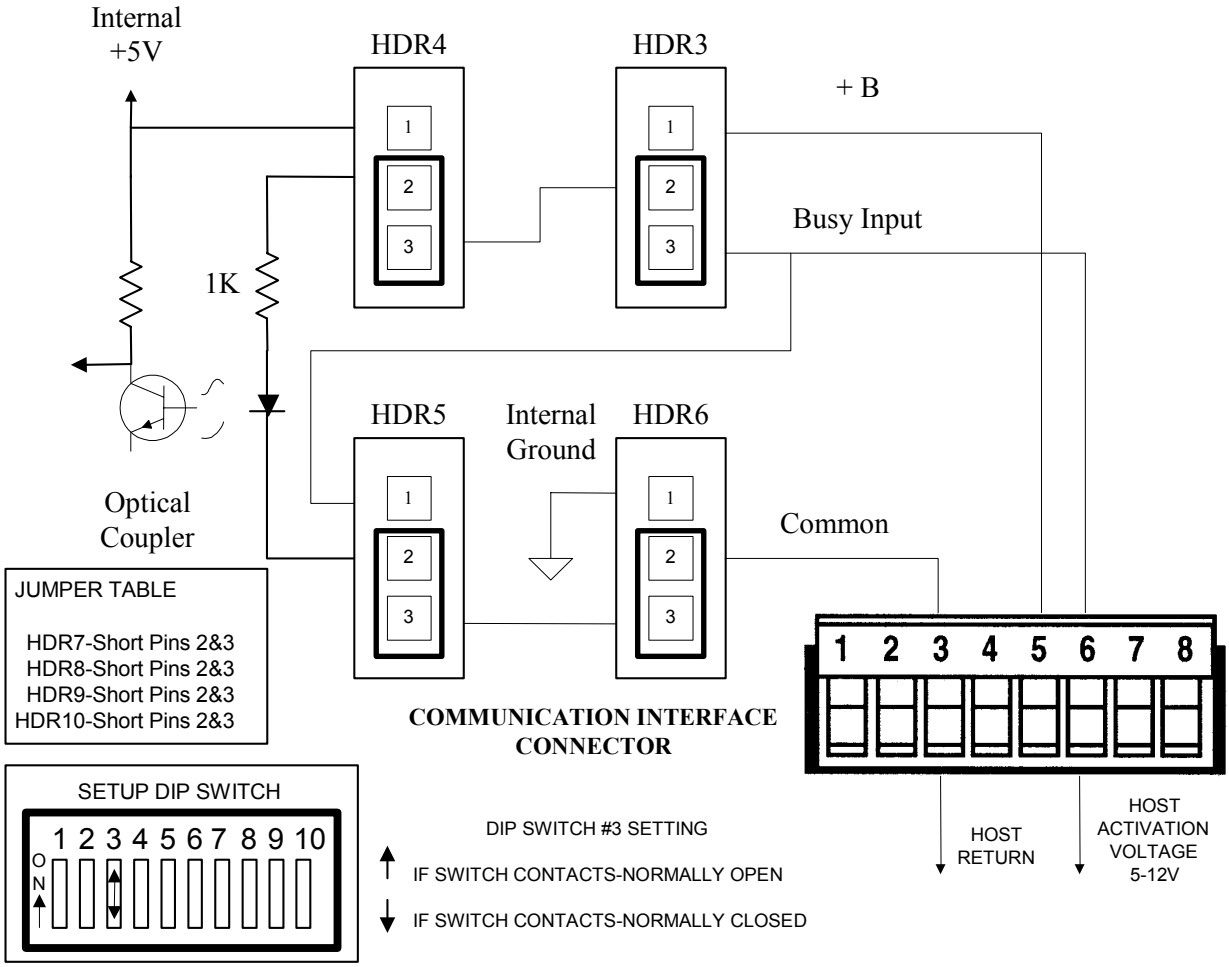


Figure 2-5B Busy Input Jumper Block Connection to Activation Voltage

Connect Host activation voltage to Busy Input pin 6, Figure 2-5B and return to common pin 3, Figure 2-5B. Install jumpers and set DIP switch #3 as per Figure 2-5B. Normally closed or normally open contacts can be used. Refer to Figure 2-5B. This circuit uses the host activation voltage to turn on the optical coupler. See Section 2.2.6 (TimeBurst Setup DIP switches) for explanation of Switch #3 setting. See Figure 2-7 to locate the jumpers on the printed circuit board.

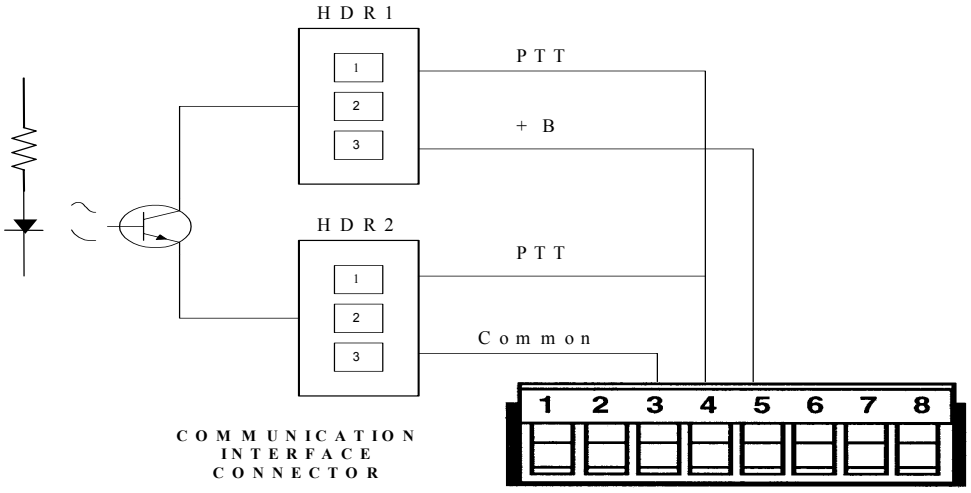


Figure 2-6 PTT Output Jumper Block

Figure 2-6 above is the jumper block for the PTT output. This diagram can be used to configure the jumpers and view the circuit schematic. Figures 2-6A and 2-6B are various hookup arrangements that can be used to implement the PTT output function. Figure 2-6A shows the configuration if the PTT output is connected to a transistor input with a pull-up resistor. Figure 2-6B shows the configuration if the PTT output is connected to an input requiring a high side voltage. See the table assignments and DIP switch settings in each of these figures. See Figure 2-7 to locate the jumpers on the printed circuit board.

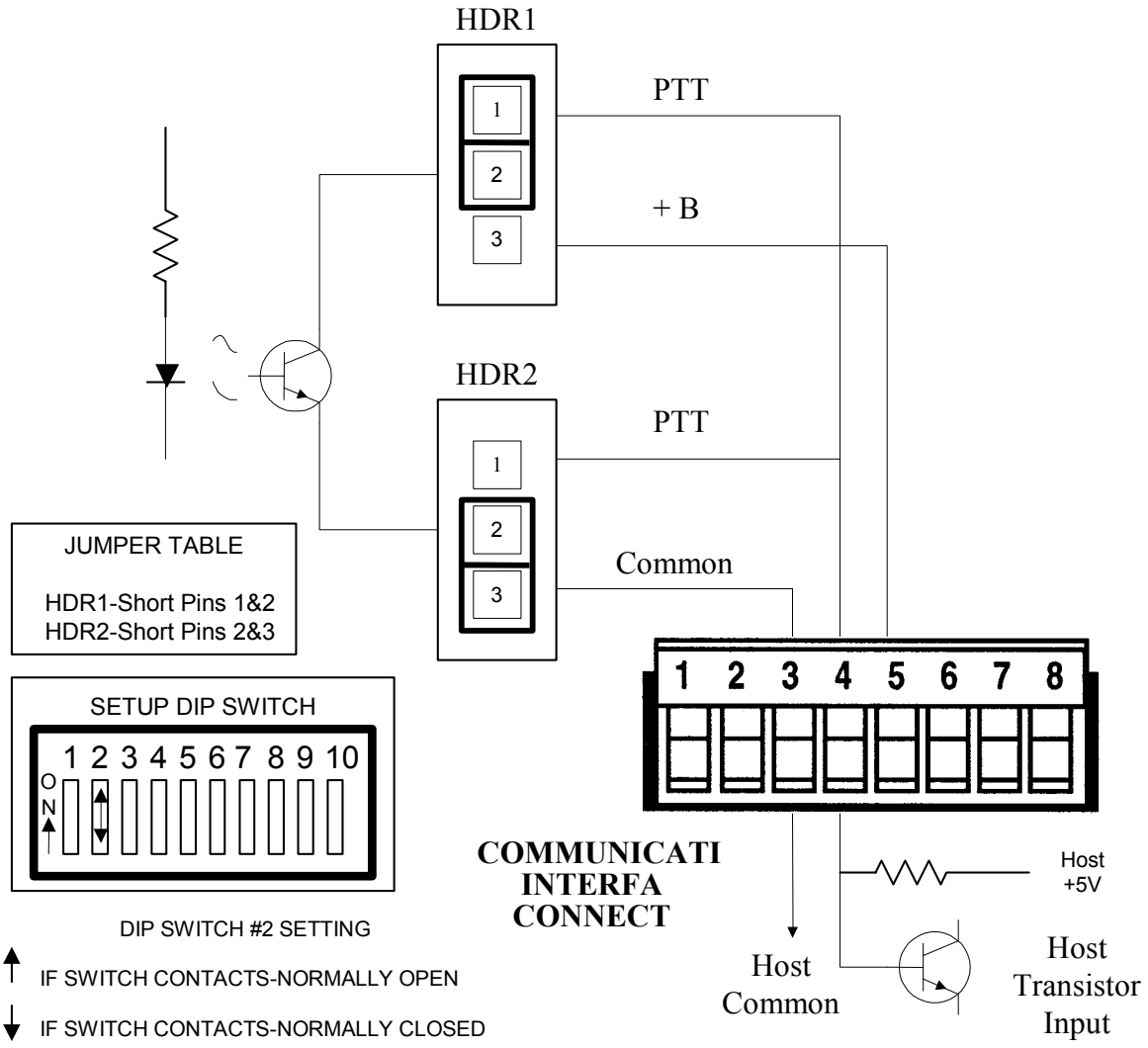


Figure 2-6A PTT Output Jumper Block Connection to a Transistor Base Input with pull up Resistor

Connect transistor base input to the PTT (pin 4 Figure 2-6A) and the system ground of the input to common (pin 3 Figure 2-6A). Install jumpers and set DIP switch #2 as per Figure 2-6A. See section 2.2.6 (TimeBurst Setup DIP switches) for the selection of activation polarity. See Figure 2-7 to locate the jumpers on the printed circuit board. The optical coupler NPN transistor is used to shunt the base voltage of the transistor to host common upon activation of PTT.

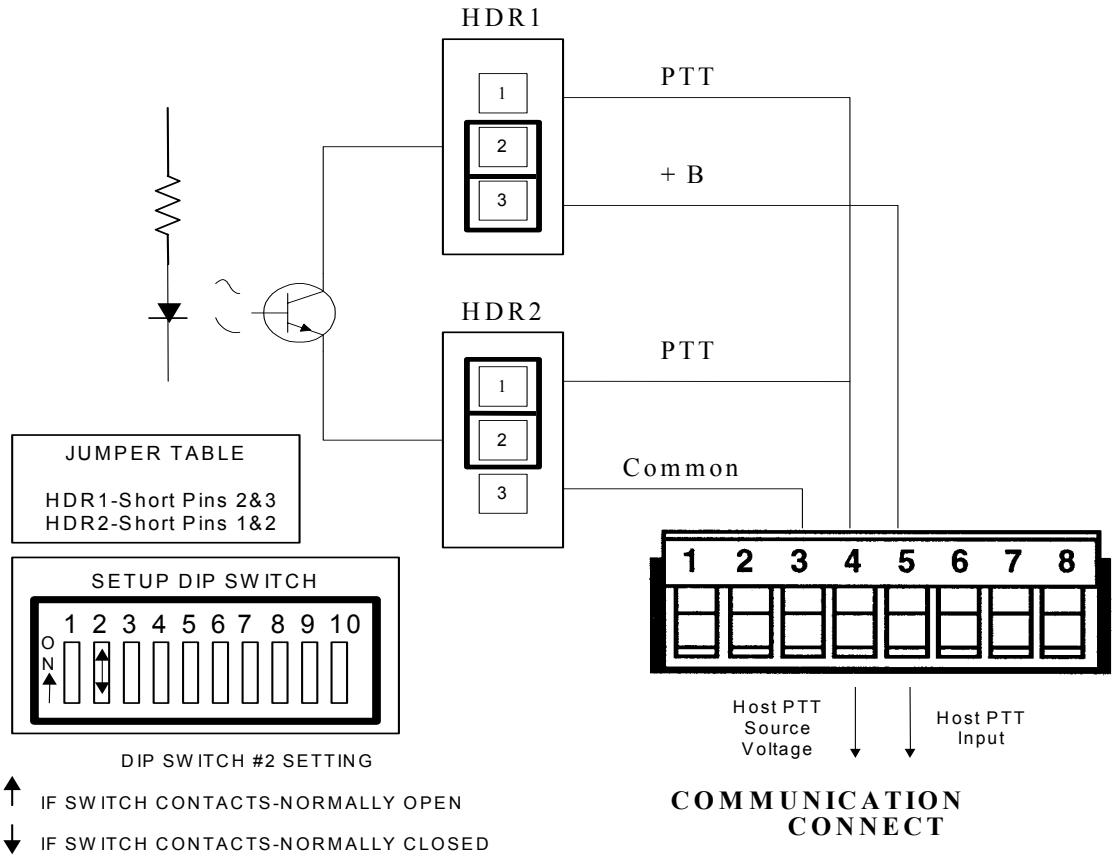


Figure 2-6B PTT Output Jumper Block Connection to Input Requiring a High Side Drive

Connect the PTT output (pin 4 Figure 2-6B) to the Host PTT input (Input Resistance > 1000 ohms) and +B (Host Power) (pin 3 Figure 2-6B). Install jumpers and set DIP switch #2 as per Figure 2-6A. See section 2.2.6 (TimeBurst Setup DIP switches) for the selection of activation polarity. See Figure 2-7 to locate the jumpers on the printed circuit board.

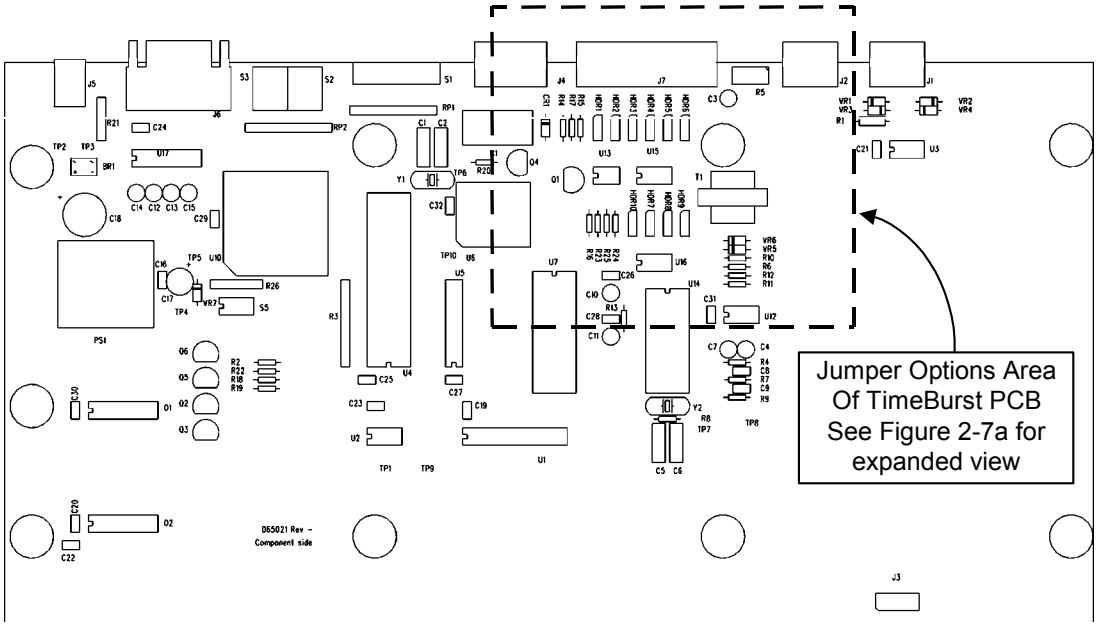


Figure 2-7 TimeBurst PCB Layout

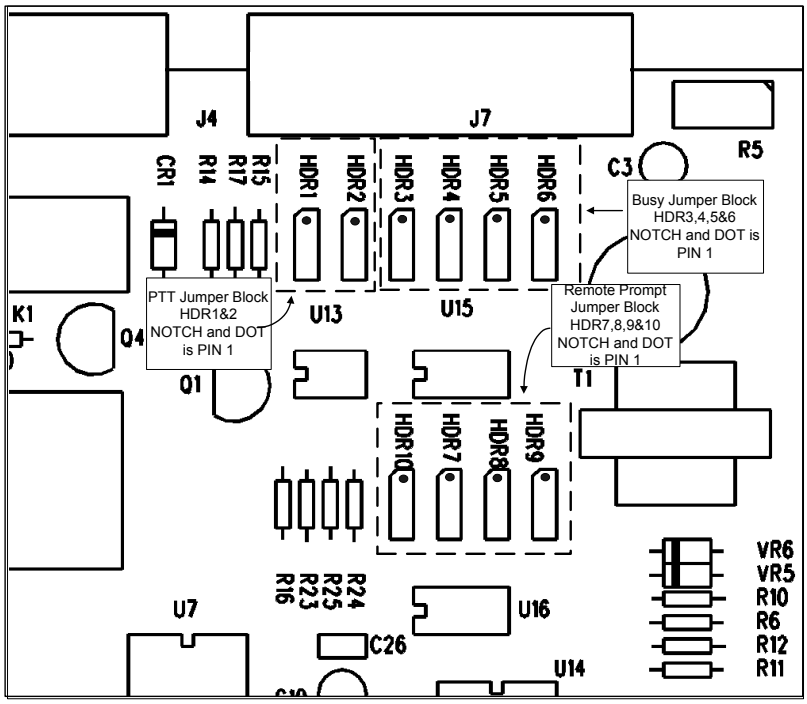


FIGURE 2-7a Expanded Jumper Section - TimeBurst PCB layout

2.2.2 TIMEBURST RS-485 INPUT: CONNECTION TO THE MASTER CLOCK

RS-485 is a balanced differential transmission requiring twisted pair cabling. The RS-485 Input Port provides a means of connecting the TimeBurst to the output of the Spectracom NetClock Master Clock to allow the TimeBurst to synchronize. The RS-485 Input Port connection requires the three-position terminal block P/N P13003 supplied in the Ancillary Kit. Figure 2-8 shows the RS-485 Input Port pin configuration.

NOTE: THE TIMEBURST WILL SYNCHRONIZE TO FORMAT 0 ONLY. THE TIMEBURST WILL NOT ACCEPT FORMAT 1.

2.2.3 TIMEBURST RS-485 OUTPUT: PASS THROUGH CONNECTION TO EXTERNAL DEVICES REQUIRING TIME DATA

Spectracom offers many devices which accept the RS-485 data stream as an input reference, including display clocks, RS-485 to RS-232 converters, talking clocks and radio link products to meet various time applications and requirements. Contact our Sales Department for information on these products. For details on Remote Output usage refer to Section 3.7(Remote Output Usage). The RS-485 Output Port connection requires the three-position terminal block P/N P13003 supplied in the Ancillary Kit. Figure 2-8 shows the RS-485 Output Port pin configuration. Refer to Section 3 (Operation) for additional information.

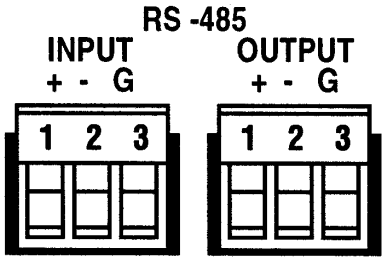


Figure 2-8 RS-485 Input And Output Connectors

2.2.4 TIMEBURST RS-232 SERVICE PORT

The RS-232 Serial Service Port enables a service technician to query the TimeBurst for operational information. Installation uses a 9-pin Series D female connector (DB9) and a serial communications cable between the TimeBurst and the computer. A communications program utilizing terminal mode is used to communicate with the TimeBurst.

Refer to Section 4 (Service Port Commands) for a complete description of the TimeBurst command set. Figure 2-9 shows the pin numbering on the 9-pin connector. Table 2-1 shows the pin assignments. The communications settings are fixed at 9600,N,8,1. The required cable is a straight through 9-pin with male to female ends.

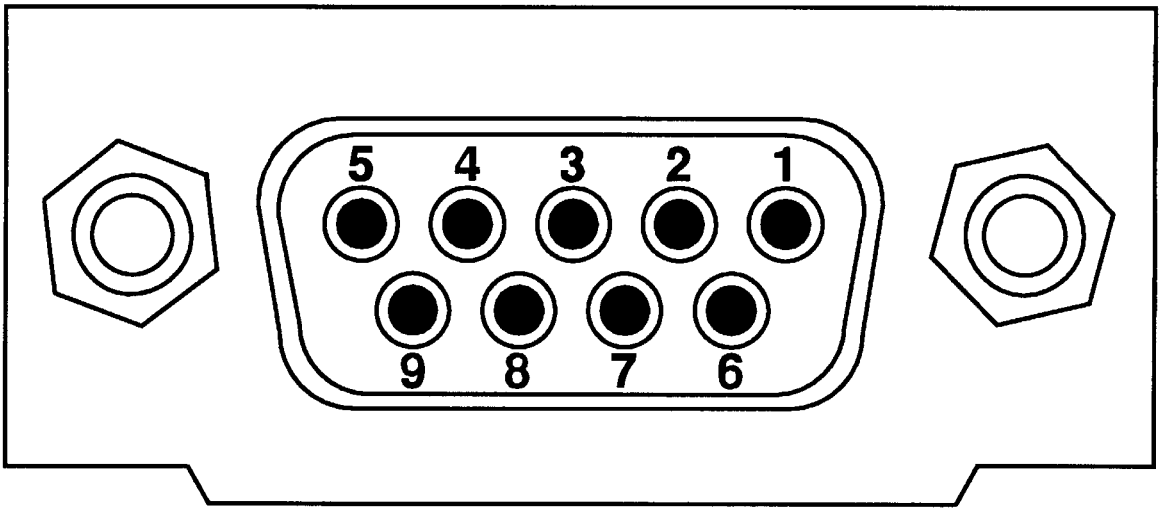


Figure 2-9 service port Pin Numbering - TimeBurst

PIN	SIGNAL	I/O	DESCRIPTION
2	RXD	O	Receive Data
3	TXD	I	Transmit Data
5	GND	-	Signal Common
6	DSR	O	Data Set Ready
7	RTS	*	Request to Send
8	CTS	*	Clear to Send

*Pins 7 and 8 are connected together internally.

Table 2-1 service Port Pin Assignments - TimeBurst

2.2.5 TIMEBURST ALARM OUTPUTS

The TimeBurst provides an Alarm output, asserted when fault conditions exist that affect the accuracy of the instrument. Section 3 provides additional details.

The alarm relay contacts are rated at 2.0 A, 30 VDC. Figure 2-10 is the schematic of the alarm relay contacts and details the connector. The mating 4-position terminal block P/N P13104 is furnished in the Ancillary Kit. Table 2-2 details contact condition for the two states.

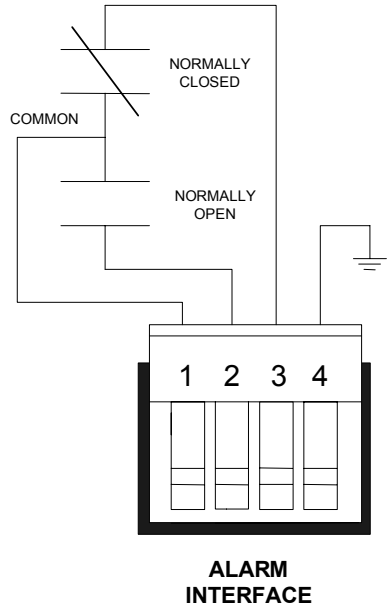


Figure 2-10 Alarm Relay Schematic and connector- TimeBurst

	RELAY CONTACT PINS	
OPERATIONAL STATUS	SHORTED	OPEN
NORMAL STATE	1-3	1-2
ALARM STATE	1-2	1-3

Table 2-2 Relay Contact Operation, TimeBurst

NOTE: The Alarm relay is de-energized when an Alarm is asserted. Therefore, continuity exists between Pins 1 and 2 during an Alarm condition.

The alarm relay resets when the condition causing the alarm is corrected. Relay contacts are isolated from ground. In addition to the alarm relay, operational status and alarm log history can be monitored using the serial service interface commands *STAT* (Status) and *DAL (Display Alarm Log)*. These commands are described in Section 4 of this manual.

2.2.6 TIMEBURST SET-UP DIP SWITCHES

A set of 10 rear panel DIP switches allow several operational parameters to be selected, including burst schedule, radio PTT (KEY) polarity, Remote Prompt Activation Polarity, and the Busy Input polarity. Switch number 1 controls the RS-485 End of Line Termination. This switch should be set to ON if the TimeBurst is at the end of the RS-485 line. If the TimeBurst is between two devices, it should be set to OFF. Switches 2 and 3 control the Busy and Prompt input activation polarities. These will determine whether the presence or absence of current in the input circuit will activate that function. If these switches are set to POS, then the absence of current will activate that function, conversely if set to NEG, the presence of current will activate the function. See section 2.2.1 (TimeBurst Communication Interface) for the appropriate settings of these switches for various input options. Switch 2 controls the polarity of the PTT

(Key) Output. If set to POS, then the output transistor will turn on upon an active PTT. If set to NEG, then the transistor will turn off. Also see section 2.2.1 for details on this output. Switches 5 through 8 control the TimeBurst communications burst schedule. The schedule can be disabled with all four switches set to OFF, or set to send data bursts periodically every 10 or 30 seconds, 15 or 30 minutes or 1,2,3 or 4 hours. Figure 2-11 and Table 2-3 provides this information.

The default setting is a scheduled burst every 10 seconds. This aides in the initial installation of the TimeBurst and TimeBridges. After installation, the DIP switches should be set for a scheduled burst no less than every 15 minutes to allow the TimeBridge oscillator to train. This schedule will depend on the specific requirements of the site and the radio channel being used.

NOTE: ANY BURST SCHEDULED FOR THE TOP OF THE HOUR WILL BE TRANSMITTED 3 MINUTES BEFORE THE TOP OF THE HOUR TO AVOID HEAVY MESSAGE TRAFFIC.

Switch No.	SET-UP									OFF	ON
1	RS-485 End of Line Termination									NO*	YES
2	Key Polarity									POS*	NEG
3	Busy Polarity									POS	NEG*
4	Prompt Polarity									POS	NEG*
	SECONDS			MINUTES		HOURS					
	0	10*	30	15	30	1	2	3	4		Broadcast
5	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF		Schedule
6	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF		Select One
7	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF		Column
8	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON		
9	Spare										
10	Spare										
	* factory defaults										

Table 2-3 Dip Switch Assignments - TimeBurst

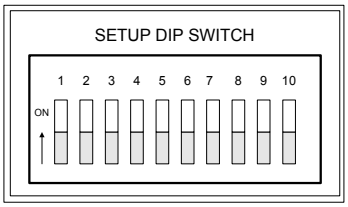


Figure 2-11 Set-Up Dip Switches - TimeBurst

2.2.7 TIMEBURST PATH DELAY ADJUSTMENT

The Path Delay Adjustment (Figure 2-12) is used to equalize the audio delay found in some radio systems. The audio delay is the amount the audio signal is delayed in time from onset of audio at the transmitter to the audio output at the receiver. The adjustments are set to equal the audio delay expected in the system. The system audio delay can be a fixed delay or it may be a variable delay that is adjusted. Modern trunked systems may have an adjustable delay.

The rotary dial marker 10 represents 10's of milliseconds; the dial marker 100 represents increments of 100 milliseconds. The total delay is the sum of the two dials. The adjustment range is 0 to 990 milliseconds in 10 millisecond increments

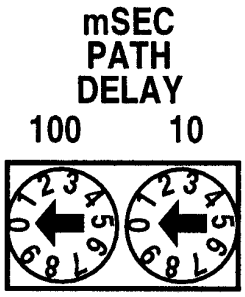


Figure 2-12 Path Delay Adjustment - TimeBurst

2.2.8 TIMEBURST DEVIATION LEVEL ADJUSTMENT

The deviation adjustment (Figure 2-13) is used to set the modem output audio level to a voltage that will deviate the host radio system at the required deviation. If the TimeBurst modem is connected to a radio system in such a way that there is an automatic level adjustment, it may not be necessary to make this adjustment. The factory default voltage is 1V AC p-p. If the host system is an input that requires a level adjustment, then using the appropriate instrument, adjust the potentiometer until the required deviation or other signal level is reached. Turning the potentiometer clockwise will increase the output signal level while turning counter-clockwise will decrease the output signal level.

To provide a continuous audio output to aid in setting the deviation level, use the TX TEST ON/OFF command. Refer to section 4.20 (TX TEST ON/OFF). The TX TEST ON/OFF command will remain on until Test Mode times out after fifteen minutes or a scheduled Burst occurs. If you need more than ten seconds (the factory default Burst schedule) to set the deviation level, change the DIP switches to obtain no scheduled Burst.

NOTE: the required deviation is a specification of your radio system. Refer to system personnel or manuals to determine this specification.

Figure 2-13 Deviation Adjustment - TimeBurst

2.2.9 TIMEBURST POWER CONNECTION

See section 2.4 (Power Connection - TimeBurst and TimeBridge.)

2.2.10 TIMEBURST CHASSIS GROUND

The chassis ground lug allows the TimeBurst chassis to be connected to an earth ground or single point ground.

2.2.11 TIMEBURST PTT SEQUENCE TIMING

The TimeBurst will execute a sequence of events when executing the PTT output keying. This timing sequence (See Figure 2-14) is specifically designed for use with a conventional or trunked radio system. When a keying sequence is initiated, the sequence will be as follows:

Sample Busy Input, and if Busy continue to wait for not Busy.

Activate PTT.

Delay for xxx milliseconds (Front Porch Delay). Default setting is 750 ms.

Send Data Transmission.

Delay for yyy milliseconds (Back Porch Delay). Default setting is 100 ms.

De-Activate PTT.

The Front and Back Porch delays are specified using the service port, see section 2.2.4 (TimeBurst RS-232 Service Port) and section 4 (Software Commands). When installing the equipment for the first time, these timing specifications will have default values of 750 milliseconds for the Front Porch Delay and 100 milliseconds for the Back Porch Delay. These settings are very conservative. Most installations will function with these default settings. If necessary, they can be altered using the Software Commands available on the service port.

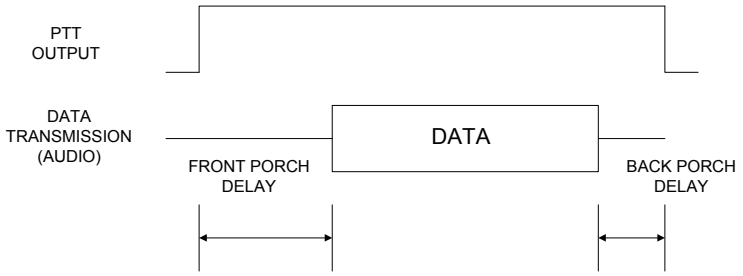


Figure 2-14 TimeBurst PTT and Data Transmission Sequence Timing

2.3 CONNECTING THE TIMEBRIDGE TO YOUR SYSTEM

A number of inputs, outputs and connections are required to integrate the TimeBridge into your existing time keeping and communications system. All of these are on the rear panel of the instrument. These connections should be made before the unit is permanently installed.

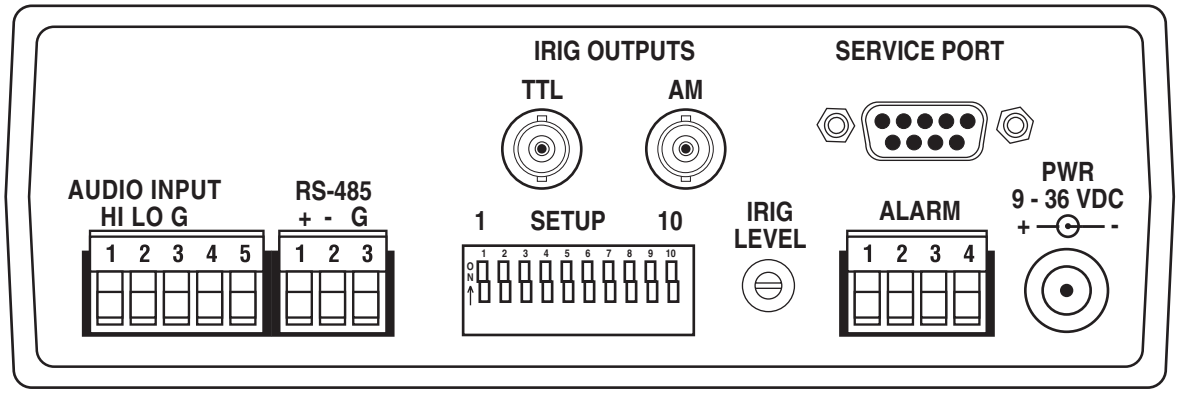


Figure 2-15 Rear Panel Connections - TimeBridge

2.3.1 TIMEBRIDGE AUDIO INPUT (MODEM) CONNECTION

The TimeBridge features an integrated analog modem that provides communications over an analog channel having the standard voice grade bandwidth of 300-3000 Hz. The input of the modem is a balanced transformer interface that can be connected to the output of the communications channel. There is a DC blocking capacitor in the circuit.

As shown in Figures 2-15 and 2-16, the modem input on the rear panel is labeled Audio Input and requires a 5-pin pluggable terminal block connector. This should be connected to the audio output of the communications channel. The input impedance is approximately 10,000 ohms, and will not affect speaker driver output levels.

NOTE: The signal level for the proper operation of the integral modem is -9 dBm to +10 dBm into 10,000 ohms. If these signal levels are not available, please contact the factory. Note that the input impedance is 10,000 ohms, and connection of this device across an audio output that is also driving an existing load such as a speaker will not appreciably alter the current drive levels.

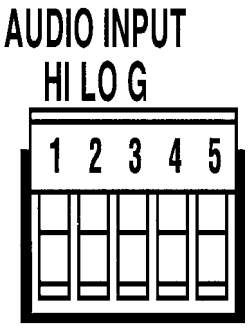


Figure 2-16 Modem Connector - TimeBridge

2.3.2 TIMEBRIDGE RS-485 OUTPUT: CONNECTION TO EXTERNAL DEVICES REQUIRING TIME DATA

The RS-485 Output Port provides a continuous once-per-second time data stream in RS-485 levels, making it ideal to distribute time data throughout a facility. Each Remote Output can drive up to 32 devices over cable lengths up to 4000 feet (1200 meters). Figures 2-17 and 2-18 provide additional electrical and connection details of the RS-485 output.

Spectracom manufactures a wide variety of instruments that accept time data inputs, including wall clocks, talking clocks, RS-485 to RS-232 converters and radio link products.

Refer to Section 3 (Operation) for additional information.

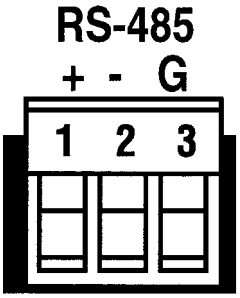


Figure 2-17 RS-485 Output Connector - TimeBridge

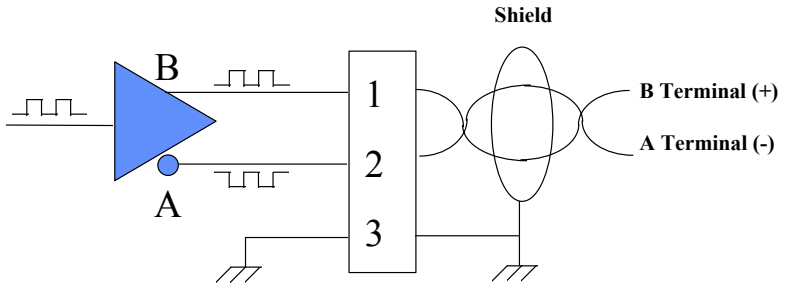


Figure 2-18 RS-485 Output Driver Schematic - TimeBridge

2.3.3 TIMEBRIDGE IRIG OUTPUTS

IRIG is an acronym for INTER-RANGE INSTRUMENTATION GROUP. In the late 1950s this group created a series of time code standards for use with recording oscillographs, magnetic tape and real time transmission. Each IRIG code standard specifies a carrier frequency that is modulated to encode date and time, as well as a series of control bits to time stamp events.

IRIG applications were initially for the military and government, but are much broader today, and include the synchronization of voice loggers, recall recorders and sequential event loggers found in emergency dispatch centers and power utilities.

The TimeBridge is able to provide an IRIG B or IRIG E code in amplitude modulated (AM) and pulse width coded (TTL) formats. A signature control feature may be enabled for the IRIG output. This removes the modulation code when the TimeBridge is in an out of sync condition. See appendix A.4 (Signature Control).

AM modulated IRIG E is available with either a 100 Hz or 1000 Hz carrier frequency, with the signal level controlled by the IRIG Level Adjustment - see Section 2.3.4 below. The IRIG output is configured using the set-up switches and level control as outlined in Sections 2.3.4 and 2.3.5. Appendix A contains detailed information on the IRIG codes.

2.3.4 TIMEBRIDGE IRIG OUTPUT LEVEL ADJUSTMENT

The signal level of the AM IRIG output is controlled by the IRIG Level potentiometer on the rear panel. This level is adjustable from 0.0 to 10.0 V p-p, allowing the unit to meet the signal level demands of a variety of equipment. The level adjust pot has no effect on the level of the IRIG TTL output.

2.3.5 TIMEBRIDGE SET-UP DIP SWITCHES

A set of 10 rear panel DIP switches (Figure 2-19) allow operational parameters to be chosen, including IRIG B or E selection, signature control, Format selection and RS-485 output baud rate. Switch 1 determines the IRIG B or E on the output. Switch 2 determines the carrier frequency for IRIG E, and must be set to 1000Hz if IRIG B is selected. Switch 3 controls the signature control feature. See Appendix A.4 for further details. Switch 5 selects the data format, either 0 or 1. See Section 3.6.1 and 3.6.2 (Format 0 and 1 data formats). Switches 6 and 7 determine the data format baud rate. The selections can be 1200, 2400, 4800 or 9600 baud. Table 2-4 provides this information. An * represents the factory default setting.

Switch No.	OFF		ON	
1	IRIG B *		IRIG E	
2	100 Hz IRIG Am Carrier		1000 Hz IRIG AM Carrier *	
3	IRIG Signature Off *		IRIG Signature On	
4	Spare			
5	RS-485 Format 0 *		RS-485 Format 1	
	RS-485 Baud Rate			
Switch	1200	2400	4800	9600
6	Off	Off	On	On *
7	Off	On	Off	On *
8	Spare			
9	Spare			
10	Spare			

Table 2-4 DIP Switch Assignments – TimeBridge

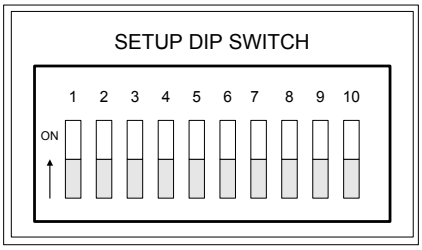


Figure 2-19 Set-Up DIP Switches – TimeBridge

2.3.6 TIMEBRIDGE RS-232 SERVICE PORT

The RS-232 Serial Service Port enables a service technician to query the TimeBridge for operational information. Installation uses a 9-pin Series D female connector (DB9) and a serial communications cable between the TimeBridge and the computer being used. A communications program utilizing terminal mode is used to communicate with the TimeBridge.

Refer to Section 4 (Service Port Commands) for a complete description of the TimeBridge command set. Figure 2-20 shows the pin numbering scheme on the 9-pin connector. Table 2-5 shows the pin assignments.

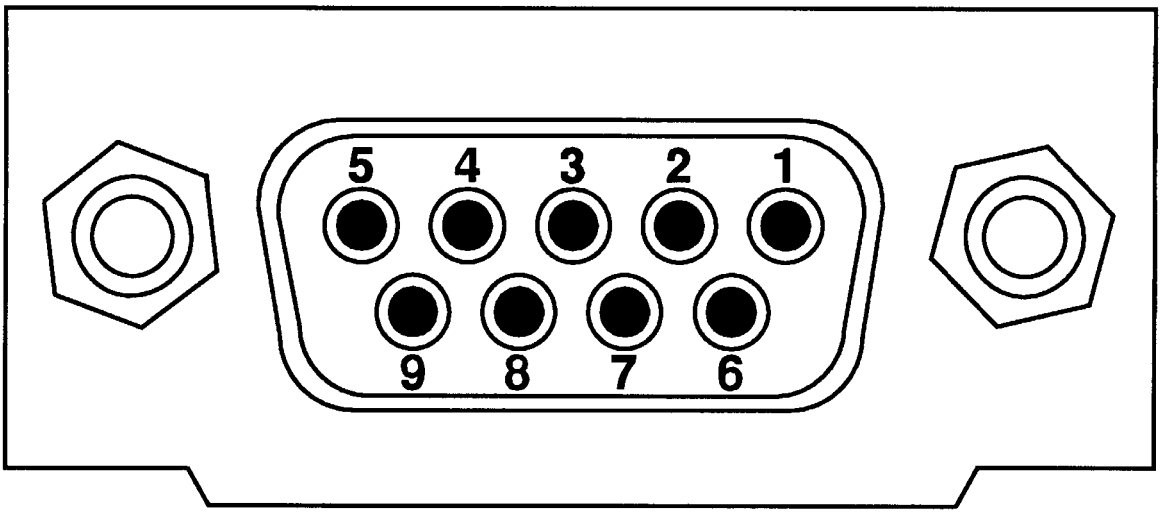


Figure 2-20 Pin Numbering - TimeBridge

PIN	SIGNAL	I/O	DESCRIPTION
2	RXD	O	Receive Data
3	TXD	I	Transmit Data
5	GND	-	Signal Common
6	DSR	O	Data Set Ready
7	RTS	*	Request to Send
8	CTS	*	Clear to Send

*Pins 7 and 8 are connected together internally.

Table 2-5 service Port Pin Assignments - TimeBridge

2.3.7 TIMEBRIDGE ALARM OUTPUTS

The TimeBridge provides an Alarm output, asserted when fault conditions exist that affect the accuracy of the instrument. Section 3 (Operation) provides additional details.

The alarm relay contacts are rated at 2.0 A, 30 VDC. Figure 2-21 provides the schematic of the alarm relay contacts and details the connector. The mating 4-position terminal block is furnished in the Ancillary Kit, P/N P13104. Table 2-6 details contact conditions for the two states.

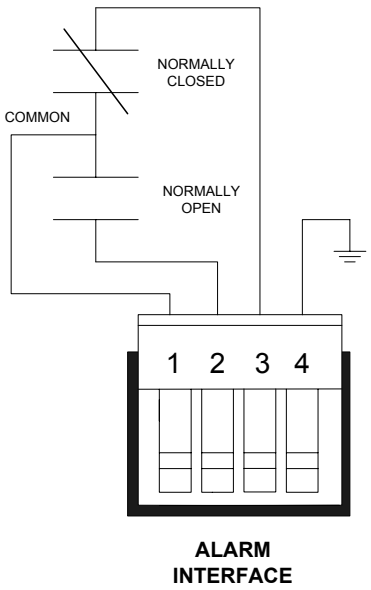


Figure 2-21 Alarm Relay Schematic AND CONNECTOR - TIMEBRIDGE

OPERATIONAL STATUS	RELAY CONTACT PINS	
	SHORTED	OPEN
NORMAL STATE	1-3	1-2
ALARM STATE	1-2	1-3

Table 2-6 Relay Contact Operation- TimeBridge

NOTE: The Alarm relay is de-energized when an Alarm is asserted. Therefore, continuity exists between Pins 1 and 2 during an Alarm condition.

The alarm relays reset when the condition causing the alarm is corrected. Relay contacts are isolated from ground. Contacts can be tied to ground by jumpering to Pin 4 of the Alarm Outputs connector. In addition to the alarm relay, operational status and alarm log history can be monitored using the serial service interface commands *STAT* (Status) and *DAL (Display Alarm Log)*. These commands are described in Section 4 (Service Information) of this manual.

2.4 POWER CONNECTION - TIMEBURST AND TIMEBRIDGE

Standard TimeBurst and TimeBridge units are powered by an external 115 VAC to 12 VDC power adapter. Units supplied with the International Power Supply have a 90 to 240 VAC, 47/63 Hz table top power adapter, which is shipped with a line cord compatible with AC receptacles (NEMA 5-15R) commonly found in the United States and Canada.

Both adapters are terminated with a barrel-type connector which plugs into the rear panel DC power jack. Secure the power connector by installing the cable clamp included in the Ancillary Kit as shown in Figure 2-22. (TimeBurst Model only. The TimeBridge does not have a cable clamp.)

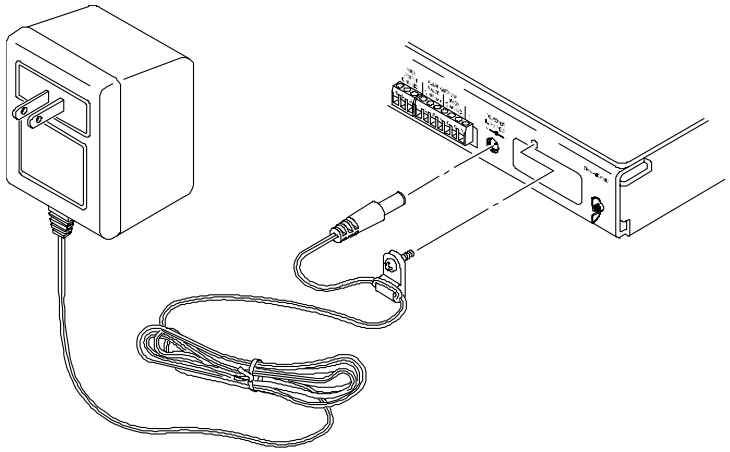


Figure 2-22 Cable Clamp Installation

2.5 INITIAL OPERATION - TIMEBURST AND TIMEBRIDGE

Complete the radio and power connections noted in Section 2.4 and plug the power adapters of both units into AC receptacles of the proper voltage. The TimeBurst and TimeBridge are powered on when the power adapter is plugged in. There are no ON/OFF switches. The bi-color (red-green) Time Sync lamps on the front panels of both instruments will be red, indicating that the clock is not synchronized and time data accuracy does not meet specifications. The lamps will turn green when the units are synchronized. See Section 3 (Operation). The initial clock time is derived from the nonvolatile RAM/Timekeeping integrated circuit in the TimeBurst and TimeBridge.

2.6 TIMEBURST AND TIMEBRIDGE FACTORY CONFIGURATION

TimeBurst and TimeBridge operational parameters can be configured to meet the requirements of many applications. Time data format output on the RS-485 ports, baud rate and IRIG format are just some of the configuration selections. Other configurations can be made using the DIP switch settings. Table 2-7 is a partial list of configurable functions and outputs. Included in the table are the output functions and the factory configuration. Refer to Section 3 (Operation) for a complete description of each output and Section 4 (Service Port Commands) for additional information.

TimeBurst TimeBridge

OUTPUT / FUNCTION	FACTORY CONFIGURATION
Service Port	Baud Rate = 9600 Data Bits = 8
RS-485 Input	Automatic baud rate detection
End of Line Termination	Off
Deviation Level Adjustment	1 V AC p-p
Broadcast Schedule	10 seconds Intervals
System Path Delay	0 milliseconds
Front Porch Delay	750 milliseconds
Back Porch Delay	100 milliseconds
Communications Key Polarity	Positive
Communications Busy Polarity	Negative
Communications Prompt Polarity	Negative

OUTPUT / FUNCTION	FACTORY CONFIGURATION
Service Port	Baud Rate = 9600 Data Bits = 8
RS-485 Output	Format 0 9600 baud
IRIG	IRIG B Signature Control OFF
IRIG AM Signal Level	2.0 V p-p mark amplitude

Table 2-7 Configuration Table - TimeBurst & TimeBridge

SECTION 3 OPERATION

OPERATION

3.0 INTRODUCTION

This section describes the front and rear panel functions and operational information for the Spectracom TimeBurst and TimeBridge units.

3.1 SYSTEM OPERATION

The TimeBurst / TimeBridge system consists of a single TimeBurst providing timing information to a multiple number of TimeBridges through a radio communications system or other analog communications system. The TimeBurst is typically connected to a Spectracom Master Clock at a location where access can be provided to the user's radio system transmitter. The TimeBridges are located at various remote sites where they can access the user's radio receivers.

In a typical system the TimeBurst is synchronized to the Master Clock via the RS-485 remote port. The Master Clock will be synchronized to UTC time via the Global Positioning System or WWVB, depending on the type of Master Clock.

The TimeBurst synchronously and periodically keys the user's radio transmitter and transmits a proprietary coded signal to the TimeBridges. Each TimeBridge receives the signal, decodes it, extracts the time information and discerns the on-time point. The TimeBridges are therefore synchronized to the radio burst and to the TimeBurst. This synchronization carries over to the RS-485 and IRIG outputs of the TimeBridges. Thus synchronous time will be distributed to any user equipment that is connected to the TimeBridges, including visual time display, audio time announcement devices, voice recorders, and computers.

The system features 250-millisecond accuracy. As a result the on-time point at the
RS-485 and IRIG outputs of the TimeBridges will be within 250 milliseconds of the on-time point of the Master Clock that is driving the system.

3.2 TIMEBURST FRONT PANEL FUNCTIONS

Refer to Figure 3-1 (TimeBurst Front Panel) and the following paragraphs for front panel functions.

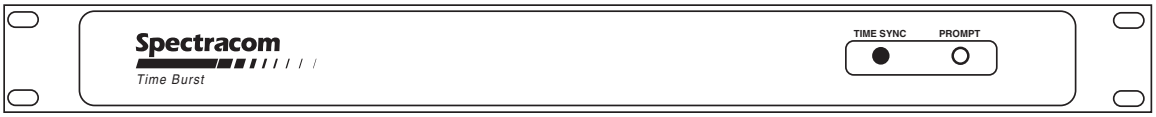


Figure 3-1 TimeBurst Front Panel

3.2.1 PROMPT PUSH BUTTON

The front panel Prompt push button manually activates a burst of data from the TimeBurst. This button can be used to manually synchronize TimeBridges rather than wait for the next scheduled burst. Activations of the manual prompt will not interfere with normally scheduled bursts.

3.2.2 TIME SYNC LAMP

This bi-color front panel LED indicates the status of time synchronization to the Master Clock. At power on this lamp is red, indicating that the TimeBurst is not synchronized to the Master Clock and time data accuracy does not meet specification.

The lamp turns green when the TimeBurst is synchronized to the Master Clock, and time data accuracy now conforms to specifications. The lamp remains green if the TimeBurst continues to receive valid communications packets.

The lamp turns red when the TimeBurst is not receiving valid communications packets. At this point an Alarm is asserted to warn that time data accuracy may be compromised. See Section 3.3.5 (Alarm Outputs) in this section.

The lamp returns to green when the equipment begins to receive valid communications packets. The Alarm is deactivated and the equipment returns to specified accuracy.

The lamp also serves to notify when there is a communication burst occurring. The lamp will momentarily dim during this activity.

3.3 TIMEBURST REAR PANEL FUNCTIONS

Refer to Figure 3-2, TimeBurst Rear Panel, and the following paragraphs for rear panel functions. Installation information is in Section 2 (Installation).

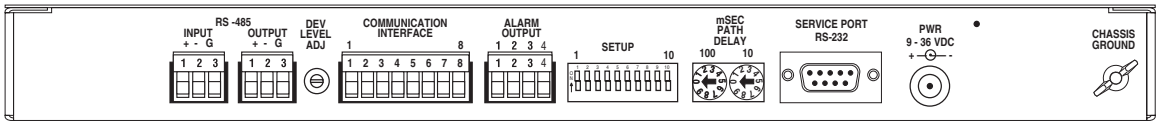


Figure 3-2 TimeBurst Rear Panel

3.3.1 REMOTE INPUTS/OUTPUTS

The TimeBurst provides one Remote Input and one Remote Output, both in RS-485 format. The Output is directly connected to the Input and is a convenient way to connect the TimeBurst to a Netclock Master Clock and reconnect instruments that were synchronized by the Netclock. This Input requires a continuous once-per-second time data stream using Format 0. Refer to Section 3.6 (Data Format Description) for a complete description of Format 0.

Spectracom offers many devices that accept the RS-485 data stream as an input reference, including display clocks, RS-485 to RS-232 converters, talking clocks and radio link products to meet various time applications and requirements. Contact our Sales Department for information on these products. For details on Remote Output usage refer to Section 3.7 (Remote Output Usage) of this chapter.

3.3.2 SERVICE PORT INTERFACE

The Serial Service Port is an RS-232 communications port. Commands to modify some operational parameters and read the performance logs are entered here. Refer to Section 4 (Service Port Commands) for a complete description of the TimeBurst command set.

The Service Port communicates at 9600 baud with a character structure of 8 data bits, no parity, and 1 stop bit. Per EIA/TIA 574 standard, the service port is classified as a data circuit-terminating equipment or DCE. Data is output on Pin 2, RXD, and commands are input on Pin 3, TXD. When connecting to a data terminal equipment, DTE, (i.e. a personal computer) a one to one cable is used. Interfacing to another DCE device (i.e. a modem) requires a null modem connection. Flow control is not required. The Request to Send (RTS) and Clear to Send (CTS) lines are internally connected together. Data Set Ready, DSR, is continuously held high by a pull up resistor.

3.3.3 UPDATING FLASH MEMORY

The Service Port is also used to update the flash memory with new code. This allows new features or code changes to be implemented into field installed units.

Upgrade announcements are posted on the Spectracom web page as they become available. The Internet address is **www.spectracomcorp.com**. A Read Me file is included in the batch file to provide the necessary instructions.

3.3.4 FLOPPY DISK UPGRADES AVAILABLE

Upgrades may also be provided on floppy disk upon request. Contact Spectracom Customer Service for upgrade requests and information.

3.3.5 ALARM OUTPUTS

The TimeBurst provides an Alarm output. An Alarm is asserted when fault conditions exist which affect the operation or accuracy of the unit:

On-Time Point Error Alarm: Measured oscillator on-time point exceeds 250 msec.

Time Sync Alarm: The equipment has lost synchronization to the data on the remote input.

CPU Fault: Critical hardware failure.

Test Mode: Unit is placed in Test Mode operation.

Loss of Power: Unit has lost power.

3.3.6 DC POWER

The standard TimeBridge is powered by a 115 VAC to 12 VDC 1.0 amp wall mount adapter. The power jack accepts barrel-type plugs with 5.5 mm OD shell and 2.1 mm ID center. Replacement adapters are available from Spectracom. Specify part number T00058.

3.4 TIMEBRIDGE FRONT PANEL FUNCTIONS

3.4.1 TIME SYNC LAMP

This bi-color LED is the only function on the front panel of the TimeBridge, and indicates the status of time synchronization of the TimeBridge to the TimeBurst. At power on this lamp is red, indicating the TimeBridge is not synchronized to the TimeBurst. If the TimeBurst is synchronized to a Master Clock and sending communications packets, then the TimeBridge will synchronize and change the front LED color to green. A valid communication packet has to be received in order for the TimeBridge to synchronize at start up. One valid packet is required to maintain synchronization. The LED will remain green and the unit synchronized as long as it continues to receive valid packets within the period allotted for the Time Sync Alarm. This period is eight hours.

The indicator turns red when the TimeBridge has not received a valid communication packet within the last eight hours. A valid communication packet is defined as a received burst of data from the TimeBurst that is synchronized to a Master Clock. At this point, an Alarm is asserted to warn that time data accuracy may be greater than 250 ms.

The indicator will momentarily dim every time a complete communication packet has been received. The indicator will flash red on/off if a hardware failure is detected during a Power On Reset. Refer to TSTAT command (section 4.19).

A recap of the status of the front panel indicator is located on a label attached to the bottom of the TimeBridge unit.

3.5 TIMEBRIDGE REAR PANEL FUNCTIONS

3.5.1 REMOTE RS-485 OUTPUT

The TimeBridge has a single RS-485 rear panel output for connection to various time devices such as display clocks, RS-485 to RS-232 converters, talking clocks and radio link products. Section 2 (Installation) provides additional information on the RS-485 protocol.

3.5.2 SERVICE PORT INTERFACE

The Serial Service Port is an RS-232 communications port. Commands to read the performance logs are entered here. Refer to Section 4 (Service Port Commands) for a complete description of the TimeBridge command set.

The Serial Setup Interface communicates at 9600 baud with a character structure of 8 data bits, no parity, and 1 stop bit. Per EIA/TIA 574 standard, the setup port is classified as a data circuit-terminating equipment or DCE. Data is output on Pin 2, RXD, and commands are input on Pin 3, TXD. When connecting to a data terminal equipment, DTE, (i.e. a personal computer) a one to one cable is used. Interfacing to another DCE device (i.e. a modem) requires a null modem connection. Flow control is not required. The Request to Send (RTS) and Clear to Send (CTS) lines are internally connected together. Data Set Ready, DSR, is continuously held high by a pull up resistor.

3.5.3 ALARM OUTPUTS

The TimeBridge provides an Alarm output. An Alarm is asserted when fault conditions exist which affect the operation or accuracy of the unit:

On-Time Point Error Alarm: Measured oscillator on-time point exceeds 250msec.

Time Sync Alarm: The period of time allotted for operation without receiving a communications burst has expired. This period of time is eight hours.

CPU Fault: Critical hardware failure.

Test Mode: Unit is placed in Test Mode operation.

Loss of Power: Unit has lost power.

3.5.4 IRIG OUTPUTS

There are two BNC connectors on the rear panel for IRIG output. IRIG is typically used to synchronize voice loggers. One connector provides IRIG in an Amplitude Modulated sinewave format and the other provides IRIG in a Pulse Modulated format. Both outputs can be used at the same time. For a detailed description of IRIG, refer to Appendix A (IRIG Code Description) and section 2.3.5 (TimeBridge Set-Up DIP switches).

3.6 DATA FORMAT DESCRIPTION

This section describes each of the data format selections available on the TimeBridge RS-485 remote output. Data formats 0 and 1 are compatible with the NETCLOCK/2 WWVB and all GPS-based NetClock master clocks.

NOTE: TimeBurst will accept Format 0 only. TimeBridge will output both Format 0 and Format 1.

3.6.1 FORMAT 0

This format includes a time sync status character, day of year, time in hours-minutes-seconds, Daylight Savings Time indicator, and time zone and time zone offset values.

The Format 0 data structure is:

Format 0: CR LF I ^ ^ DDD ^ HH:MM:SS ^ DTZ=XX CR LF

where:

CR	=	Carriage Return
LF	=	Line Feed
I	=	Time Sync Status (space, ?, *)
^	=	Space separator
DDD	=	Day of Year (001-366)
HH	=	Hours (00-23)
:	=	Colon separator
MM	=	Minutes (00-59)
SS	=	Seconds (00-60)
D	=	Daylight Savings Time indicator (S, I, D, O)
TZ	=	Time Zone
XX	=	Time Zone offset (00-23)

The leading edge of the first character (CR) marks the on-time point of the data stream.

The time sync status character I is defined as

(Space)	=	Whenever the front panel Time Sync lamp is green.
?	=	When the receiver is unable to track any satellites and the Time Sync lamp is red.
*	=	When the receiver time is derived from the battery backed clock or set manually through the Serial Setup Interface.

The Daylight Saving Time indicator D is defined as:

S	=	During periods of standard time for the selected DST schedule.
I	=	During the 24-hour period preceding the change into DST
D	=	During periods of Daylight Saving Time for the selected DST schedule
O	=	During the 24-hour period preceding the change out of DST

Example: 271 12:45:36 DTZ=08

The example data stream provides this information:

Sync Status: Time synchronized to GPS
Date: Day 271
Time: 12:45:36 Pacific Daylight Time
D = DST, Time Zone 08 = Pacific Time

3.6.2 FORMAT 1

This format provides the fully decoded time data stream. Format 1 converts the received day of year data (001-366) to a date consisting of day of week, month, and day of the month. Format 1 also contains a time sync status character, year, and time reflecting time zone offset and DST correction when enabled.

The Format 1 data structure is:

Format 1: CR LF I ^ WWW ^ DDMMMYY ^ HH:MM:SS CR LF

where:

CR	=	Carriage Return
LF	=	Line Feed
I	=	Time Sync Status (space, ?, *)
^	=	Space separator
WWW	=	Day of Week (MON, TUE, WED)
DD	=	Numerical Day of Month (01-31)
MMM	=	Month (JAN, FEB, MAR)
YY	=	Year without century (98, 99, 00 etc.)
HH	=	Hours (00-23)
:	=	Colon separator
MM	=	Minutes (00-59)
SS	=	Seconds (00-60)

The leading edge of the first character (CR) marks the on-time point of the data stream.

The time sync status character I is defined as:

(Space)	=	Whenever the front panel Time Sync lamp is green.
?	=	When the receiver is unable to track any satellites and the Time Sync lamp is red.
*	=	When the receiver time is derived from the battery backed clock or set manually through the Serial Setup Interface.

Example: * FRI 28JUN96 12:45:36

The example data stream provides this information:

Sync Status:	The clock is not time synchronized to GPS. Time is derived from the battery backed clock or set manually
Date:	Friday, June 28, 1996
Time:	12:45:36

3.7 REMOTE OUTPUT USAGE

The Remote Output on the TimeBridge provides a continuous once-per-second time data stream in RS-485 levels. RS-485 is a balanced differential transmission that offers exceptional noise immunity, long cable runs and multiple loading, making RS-485 ideal for distributing time data throughout a facility. Each Remote Output can drive 32 devices over cable lengths up to 4000 feet (1200 meters).

Spectracom manufactures wall clocks, talking clocks, RS-485 to RS-232 converters and radio link products that use the RS-485 data stream as an input.

Figures 3-3 and 3-4 illustrate typical RS-485 time data bus interconnections. Follow the guidelines listed below when constructing the RS-485 data bus.

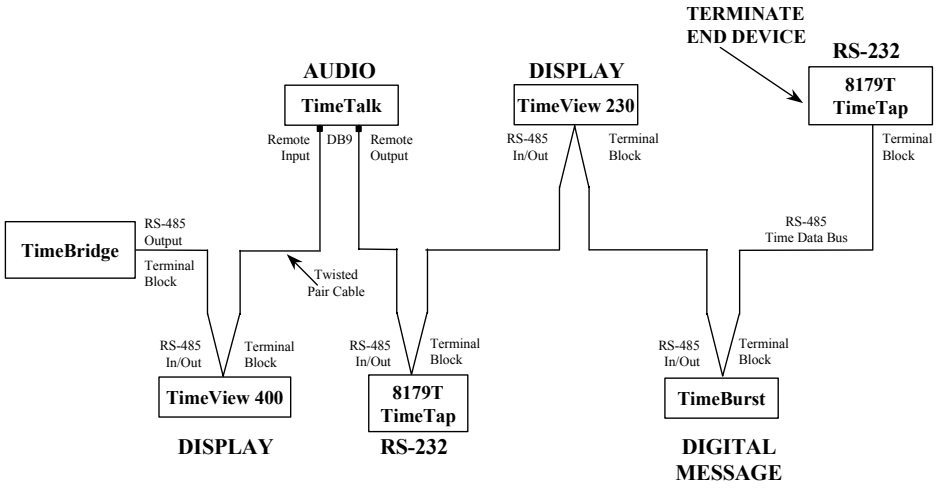


Figure 3-3 One-Way Bus Installation

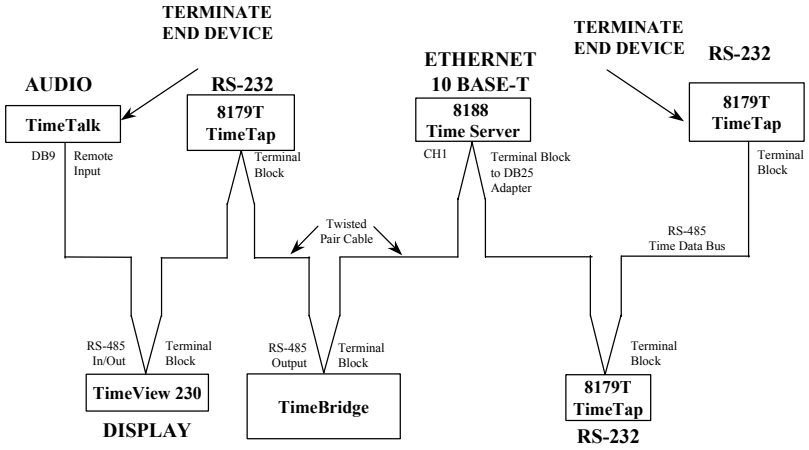


Figure 3-4 SPlit Bus Configuration

3.7.1 RS-485 GUIDELINES

3.7.1.1 CABLE SELECTION

Low capacitance, shielded twisted pair cable is recommended for installations where the RS-485 cable length is expected to exceed 1500 feet (450 meters). Table 3-1 suggests some manufacturers and part numbers for extended distance cables. These cables are specifically designed for RS-422 or RS-485 applications; they have a braided copper shield, nominal impedance of 120 ohms and a capacitance of 12 to 16 pF per foot.

MANUFACTURER	PART NUMBER
Belden Wire and Cable Company 1-800-BELDEN-1	9841
Carol Cable Company 606-572-8000	C0841
National Wire and Cable Corp. 232-225-5611	D-210-1

Table 3-1 Cable Sources for RS-485 Lines Over 1500 Feet

For cable runs less than 1500 feet, a lower-cost twisted pair cable may be used. Table 3-2 provides some possible sources.

MANUFACTURER	PART NUMBER
Alpha Wire Corporation 1-800-52ALPHA	5471
Belden Wire and Cable Company 1-800-BELDEN-1	9501
Carol Cable Company 606-572-8000	C0600

Table 3-2 Cable SOurces For RS-485 LInes Under 1500 Feet

3.7.1.2 RS-485 LOADING

The TimeBridge remote output can drive up to 32 RS-485 devices, including these Spectracom models:

TimeView™ 230, Model 8175, is a display clock with 2.3-inch high green LED digits. The TimeView 230 terminal block input connects directly to the RS-485 data bus.

TimeView™ 400, Model 8177, features large 4 inch high LED digits in a green display. The TimeView 400 terminal block input connects directly to the RS-485 data bus.

The Spectracom TimeTap™, Model 8179T, is an RS-485 to RS-232 converter. The TimeTap is used to synchronize dispatch consoles, CADs, computer networks, work stations, and other devices accepting an RS-232 input. The TimeTap connects to the
RS-485 data bus using a terminal block connector.

The **TimeTalk™**, Model 8180, provides an audio time of day announcement to time stamp voice recorders or for broadcast over radio transmitters. The TimeTalk connects to the RS-485 data bus using DB9 connectors.

The **NTP Time Provider™**, Model 8188, is an ethernet time provider which supports NTP, SNTP and UDP/Time protocols. The Model 8188 accepts only Format 0 and connects to the RS-485 bus through a terminal block to DB25 adapter.

NOTE: The TimeBurst does not provide driving capability on it's output. The Output Port only passes the Data.

3.7.1.3 CONNECTION METHOD

The RS-485 transmission line must be connected in a daisy chain configuration as shown in Figures 3-3 and 3-4. In a daisy chain configuration the transmission line connects from one RS-485 receiver to the next. The transmission line appears as one continuous line to the RS-485 driver.

A branched or star configuration is not recommended. This method of connection appears as taps or stubs to the RS-485 transmission line. The driver will "see" multiple transmission lines instead of one continuous line. Stub lengths affect the bus impedance and capacitive loading which could result in reflections and signal distortion.

3.7.1.4 CONNECTING TO TIMEVIEW WALL CLOCKS

These units use a 6-position terminal block to connect to the RS-485 data bus. Connect TimeView Wall Clocks to the TimeBurst Remote Output as shown in Figure 3-5.

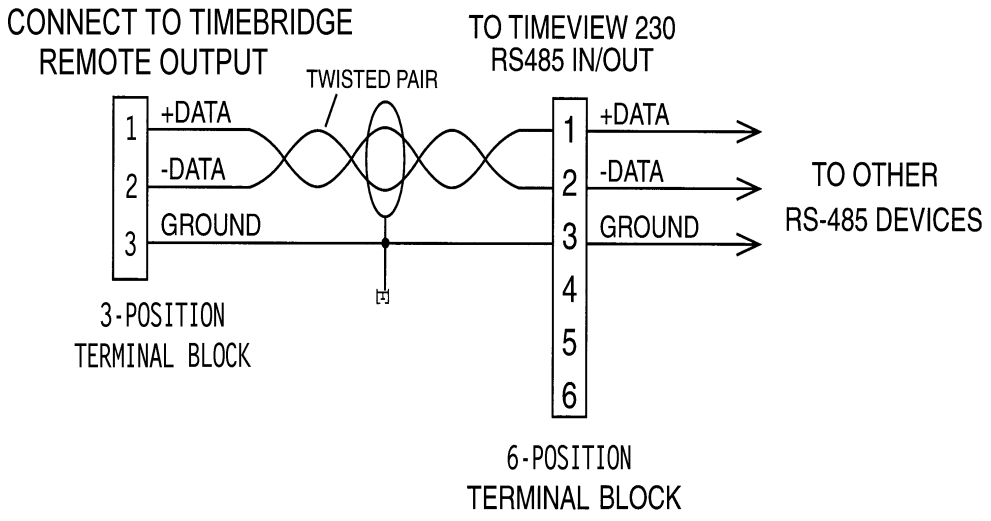


Figure 3-5 TImeview RS-485 Interface

3.7.1.5 CONNECTING THE TIMETALK, MODEL 8180

Connect this unit to the RS-485 time data bus as shown in Figure 3-6. The synchronizing data stream is input on the TimeTalk Remote Input connector (DB9 male) and passed through to the Remote Output connector (DB9 female).

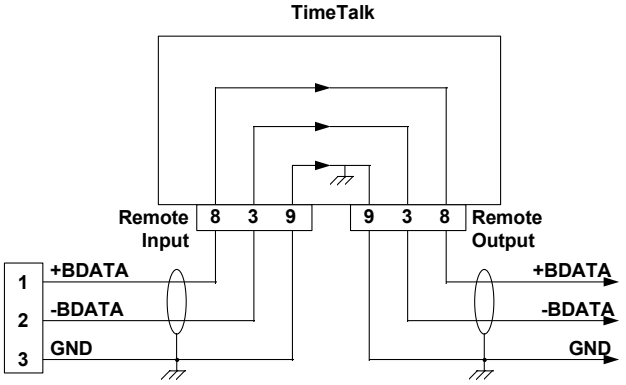


Figure 3-6 Timetalk RS-485 INterface

3.7.1.6 CONNECTING TO THE MODEL 8188

THE MODEL 8188 ACCEPTS FORMAT 0 AND CONNECTS TO THE RS-485 DATA BUS THROUGH A TERMINAL BLOCK TO DB25 ADAPTER. CONNECT TO THE TIMEBRIDGE AS SHOWN IN FIGURE 3-7.

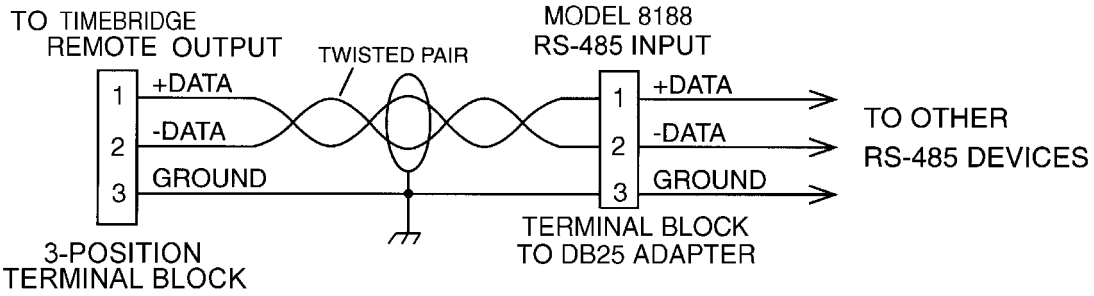


FIGURE 3-7 MODEL 8188 RS-485 INTERFACE

3.7.1.7 TERMINATION

Terminate the end device on the RS-485 time data bus. For a one-way bus installation (as shown in Figure 3-3), terminate the last device on the bus. The RS-485 data bus can be split in two directions as shown in Figure 3-4. In a split bus configuration, terminate the devices installed on each end of the bus. Spectracom products include either a built-in termination switch or a 120-ohm resistor to add to the input to terminate the RS-485 bus when required. The switch places a 120-ohm termination resistor across the RS-485 line.

SECTION 4 SERVICE PORT COMMANDS

SERVICE PORT COMMANDS

4.0 INTRODUCTION

The rear panel Service Port of the TimeBurst and TimeBridge allows the user to monitor the operation of the units. Table 4-1 provides a listing of the command sets for each unit in alphabetical order.

These commands contain a hierarchy of *Read*, *Set* and *Test Modes*. Figure 4-1 illustrates the command structure. *Read* Mode is the base level; when in *Read Mode* the user may only view responses to commands. From *Read Mode* the user may select to enter *Test* or *Set Mode*. *Set Mode* allows the user to not only view command responses, but configure changes to certain functions. *Test Mode* allows the user access to special test commands, as well as all *Read* and *Set Mode* commands. After entering *Set Mode* or *Test Mode*, the unit will "time out" and return to *READ Mode* after 15 minutes of inactivity.

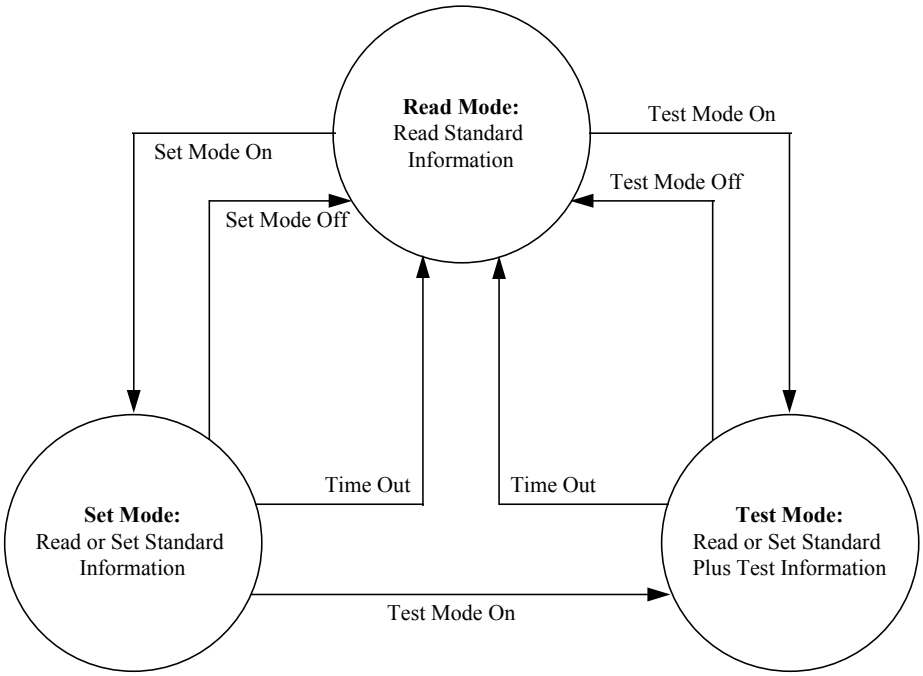


Figure 4-1 Command Structure

Command	Description	Burst	Bridge	Mode	Paragraph
BPD	display back porch delay in 10's of ms	√		Read	4.1
BPD sss	set back porch delay in 10's of ms	√		Set	4.1
BS	display broadcast schedule	√		Read	4.2
DAL	display complete alarm log	√	√	Read	4.3
DAL L	display last alarm log entry	√	√	Read	4.3
DAL P	display alarm log one entry at a time	√	√	Read	4.3
DATE	display date	√	√	Read	4.4
DATE yyyy/mm/dd	set date	√	√	Set	4.4
DCL	display complete communications log	√	√	Read	4.5
DCL L	display last communication log entry	√	√	Read	4.5
DCL P	display communication log one entry at a time	√	√	Read	4.5
DEF	set factory defaults	√		Set	4.6
ECHO ON/OFF	enable/disable echo mode	√	√	Read	4.7
FLASH PAGE	display flash code memory checksums	√	√	Read	4.8
FPD	display front porch delay in 10's of ms	√		Read	4.9
FPD sss	set front porch delay in 10's of ms	√		Set	4.9
HELP or ?	displays the command set	√	√	Read	4.10
MR	display last modem report	√	√	Test	4.11
MR ON/OFF	modem report on/off	√	√	Test	4.11
MSTAT AND CMAC	display modem status report		√	Read	4.12
SET PAGE TO 1/2	set flash memory code page to page 1/2	√	√	Test	4.13
SM	query set mode status	√	√	Read	4.14
SM ON/OFF	set mode on/off	√	√	Read	4.14
STAT	display status	√	√	Read	4.15
TIME	display time	√	√	Read	4.16
TIME hh:mm:ss	set time in 24 hour format	√	√	Set	4.16
TIME ON/OFF	enable/disable display time in real time	√	√	Test	4.17
TM	query test mode status	√	√	Read	4.18
TM ON/OFF	enable/disable test mode	√	√	Read	4.18
TSTAT	display reset test information	√	√	Read	4.19
TX TEST ON/OFF	Transmits continuous burst	√		Test	4.20
VER	display the software version numbers	√	√	Read	4.21

Table 4-1 Alphabetical List Of Commands
Time Burst AND Time Bridge

4.1 BPD - BACK PORCH DELAY COMMAND (TIMEBURST ONLY)

The ***BPD*** command reads or sets the Back Porch Delay value. The set mode must be enabled in order to set the front porch delay. Use the SM ON command to enable set mode. To display the Back Porch Delay, issue the ***BPD*** command as shown below:

Type: ***SM ON <ent>***
Response: SET MODE ENABLED

Type: ***BPD <ent>***
Response: MODEM DELAYS
FRONT PORCH (ms) = 750*
BACK PORCH (ms) = 100*
DELAY FOLLOWED BY * IS THE DEFAULT VALUE

To set the Back Porch Delay, place the unit in *Set Mode*, then issue the ***BPD*** command as follows:

Type: ***BPD sss <ent>***
Where: sss = seconds of delay in 10ms increments

The equipment responds with the BPD message reflecting the data entered. The back porch delay is the period of time between the end of the data transmission and the deactivation of the PTT signal (push to talk-Communication Interface Connector Pin 4). This period of time can be set to a value in the range of 0 to 990 ms. This delay can be used to establish a quiet audio period after transmission of the data. The TimeBridge will benefit from a reasonable delay setting, since it will provide a period of time for the data received to be decoded without dealing with additional noise being received. Unless the audio equipment being used to send the data has additional requirements, this setting should be set to 100 ms. If the backporch delay has never been set with the BPD sss command, then an * will be displayed following the delay value indicating that the value is the default value inserted by the equipment.

4.2 BS-BROADCAST SCHEDULE COMMAND (TIMEBURST ONLY)

The ***BS*** command reads the Broadcast Schedule. To display the current Broadcast Schedule and the time of the next scheduled burst issue the ***BS*** command as shown below:

Type: ***BS <ent>***

Response: BROADCAST SCHEDULE = EVERY 10 SECONDS from DIP SWITCH
SYSTEM PATH DELAY = 000 milliseconds
NEXT BROADCAST TIME = 00:20:40

The Broadcast Schedule is determined by the dip switch settings. See section 2.2.6 (Installation) for details. This command provides a mechanism for reviewing the DIP switch and audio delay settings. The broadcast schedule setting determines how often the TimeBurst will send a burst of data. This setting can be anyone of the following: disabled, 10 or 30 seconds; 15 or 30 minutes; 1,2,3 or 4 hours. The system path delay is a setting that will compensate for time delays in the audio path. It can be set between the values of 0 to 990 ms.

4.3 DAL - DISPLAY ALARM LOG COMMAND

The command, ***DAL***, causes the TimeBurst and TimeBridge to output the alarm history log. Each time a change in alarm status occurs an alarm log entry is created. An alarm log includes the UTC time, date of the log, day of the year and log entry number, and lists the event causing the log entry. There are three possible alarm events. These are a hardware (H/W) reset, alarm activation due to the time synchronization being exceeded and alarm de-activation when the time synchronization is regained. See the specifications listed in Appendix C (Specifications) for the time synchronization alarm trigger point.

The complete alarm log will be displayed with the DAL command. The command followed by a space and the letter P will display an entry at a time. In this mode, at the end of each entry the option to display more or quit will be given. These two options can be selected by pressing the space or escape keys. The command followed by a space and the letter L will display the last entry.

Type: ***DAL <ent>*** (display complete log)
- OR -
DAL P <ent> (one entry at a time)
- OR -
DAL L <ent> (last entry output)

An example of a paged alarm log is shown below:

ALARM LOG ENTRY#=24
EVENT-H/W RESET
DATE=1997-09-30,TIME=17:24:33
YDAY=274,WDAY=3
MORE <SP> QUIT <ESC>

4.4 DATE COMMAND

The ***DATE*** command reads or sets the date. To display the current UTC date, issue the ***DATE*** command as shown below:

Type:	***DATE <ent>***	
Response:	DATE =	YYYY - MM - DD
Where:	YYYY =	Year value, 1999, 2000, 2001, etc.
	MM =	Month value, 01 to 12, 01= January, 04= April
	DD =	Day of the month, 01 to 31
	- =	Hyphen

To set the date, place the equipment in *Set Mode*, then issue the ***DATE*** command as follows:

Type:	***DATE YYYY-MM-DD <ent>***
Where:	***YYYY-MM-DD*** = As defined above.

The equipment responds with the date message reflecting the date entered.

NOTE: The date can be set at any time, but when the equipment is actively receiving communications, the date will be overwritten with the received information.

Example: Set the date for May 9, 1997.

Type:	***SM ON <ent>***
Response:	SET MODE ENABLED
Type:	***DATE 1997-05-09 <ent>***
Response:	DATE IS 1997-05-09

4.5 DCL - DISPLAY COMMUNICATIONS LOG COMMAND

The command, ***DCL***, causes the TimeBurst and TimeBridge to output the communication history log. Each time a communications packet is received on the TimeBridge and transmitted on the TimeBurst, a communications log entry is created. A communications log entry includes the log entry number and data contained in the received and transmitted data packet. This data is the message identification number, message sequence number, any errors accumulated during the data reception (TimeBridge only), the synchronization character, time zone number, daylight savings time character, UTC time in hours, minutes, seconds and hundredths of a second, date, day of the week, and the day of the year.

The complete communication log will be displayed with the DCL command. The command followed by a space and the letter P will display one entry at a time. At the end of each entry the option to display more or quit will be given. These two options can be selected by pressing the space or escape keys. The command followed by a space and the letter L will display the last entry.

Type: ***DCL <ent>*** (display complete log)
- OR -
DCL P <ent> (one entry at a time)
- OR -
DCL L <ent> (last entry output)

An example of a TimeBurst paged communications log is shown below:

```
COMMUNICATIONS LOG ENTRY#=54
SOURCE=SCHEDULE
ID=110,SEQ=005
SYNC=IN ,TZ=05,DST=S
DATE=1997-01-02,TIME=08:00:50:25
YDAY=350,WDAY=5
MORE <SP> QUIT <ESC>
```

A description of the data contained in the TimeBurst log is shown below:

Log Entry Data Example	
COMMUNICATIONS LOG ENTRY#=14	The communications log can accumulate 100 entries. The entry number is indicated here.
SOURCE=SCHEDULE	The source can be the schedule as determined by the setup DIP switches, the remote prompt input, front panel prompt or a change in the continuity of the data stream into the RS485 port.
ID=110	The messages received by the TimeBridge are identified with a number. The number of this received message is 110.
SEQ=097	Messages received by the TimeBridge occur periodically. Each message has a sequence number that is 1 plus the number of the previous message. This is this sequence number
SYNC=IN	This is the synchronization character contained in the message. It represents the synchronization status of the data. In Synchronization - IN Out of Synchronization - OUT Manually Loaded Data - MAN
TZ=05	This number represents the time zone. This number can range from 0 - 23.
DST=D	DST is a character that represents the daylight savings time. This character can be D, I, S or O or a space.
DATE=1997-10-01	This is the date of the transmission
TIME=12:38:50:25	This is the time of the transmission
YDAY=274	This is the day of the year of the transmission
WDAY=4	This is the day of the week of the transmission

An example of a TimeBridge paged communications log is shown below:

COMMUNICATIONS LOG ENTRY#=48
ID=110,SEQ=053
ERROR-NONE
SYNC=IN ,TZ=05,DST=S
DATE=0097-01-02,TIME=08:06:10:25
YDAY=350,WDAY=5
MORE <SP> QUIT <ESC>

A description of the data contained in the TimeBridge log is shown below:

Log Entry Data Example	
COMMUNICATIONS LOG ENTRY#=14	The communications log can accumulate 100 entries. The entry number is indicated here.
ID=110	The messages received by the TimeBridge are identified with a number. The number of this received message is 110.
SEQ=097	Messages received by the TimeBridge occur periodically. Each message has a sequence number that is 1 plus the number of the previous message. This is the sequence number
ERROR	ERROR describes any errors in the process of receiving data transmission from the TimeBurst.
SYNC=IN	This is the synchronization character contained in the message. It represents the synchronization status of the data. In Synchronization - IN Out of Synchronization - OUT Manually Loaded Data - MAN
TZ=05	This number represents the time zone. This number can range from 0 -23.
DST=D	DST is a character that represents the daylight savings time. This character can be D, I, S or O or a space.
DATE=1997-10-01	This is the date of the transmission
TIME=12:38:50:25	This is the time of the transmission
YDAY=274	This is the day of the year of the transmission
WDAY=4	This is the day of the week of the transmission

4.6 DEF-SET FACTORY DEFAULTS COMMAND (TIMEBURST ONLY)

The ***DEF*** command returns all specific parameters to the factory default settings. The equipment must be placed in *Set Mode* to execute the ***DEF*** command. The factory default settings are listed below for the TimeBurst.

TimeBurst Default Settings
Front Porch Delay = 750 ms
Back Porch Delay = 100 ms

To restore the equipment to factory default settings enter the following:

Type: ***SM ON <ent>***
Sample response: *SET MODE ENABLED*

Type: ***DEF <ent>***
Response: *DEFAULTS SET*

4.7 ECHO ON / ECHO OFF COMMAND

The echo on and echo off commands will enable and disable the service port echo feature. When Echo is enabled, all characters received by the service port will be echoed back to the sender. When Echo is disabled, this action will not take place. The default mode is Echo enabled, thus communications from a terminal or terminal emulator will be echoed back to the user. This is the preferred method of handling the service port communications. If the echo is not desired, as in the case of a computer program being used to automate the service port commands, then the echo feature can be disabled. To change to Echo Off enter the following:

Type: ***ECHO OFF <ent>***
Response: ECHO DISABLED

To return to the Default setting of ECHO ON

Type: ***ECHO ON <ent>***
Response: ECHO ENABLED

4.8 FLASH PAGE COMMAND

The Flash Page command will display the checksum of both flash code memory pages. The operating code for the TimeBurst and TimeBridge consists of a flash memory device comprised of two memory spaces referred to as page 1 and page 2. Each of these pages can contain a unique version of code that can be updated at any time using the remote programming capabilities. See section 2 (installation) for details on remote programming of the TimeBurst and TimeBridge. This command is used to display and verify the checksums of both pages.

Type: ***FLASH PAGE <ent>***

An example of a flash page command response is shown below:

THE CURRENT FLASH MEMORY PAGE=2
PAGE 1 CODE CHECKSUM = ok,4F
PAGE 2 CODE CHECKSUM = ok,BE

The ok response will be replaced with a question mark (?) if the checksum of its respective page is incorrect, then the integrity of the code for that page has been compromised

4.9 FPD - FRONT PORCH DELAY COMMAND (TIMEBURST ONLY)

The FPD command reads or sets the Front Porch Delay The set mode must be enabled in order to set the front porch delay. Use the SM ON command to enable set mode. To display the Front Porch Delay, issue the FPD command as shown below:

Type: ***SM ON <ent>***
Response: SET MODE ON

Type: ***FPD <ent>***
Response: MODEM DELAYS
FRONT PORCH (ms) = 750*
BACK PORCH (ms) = 100*
DELAY FOLLOWED BY * IS THE DEFAULT VALUE

To set the Front Porch Delay, place the unit in *Set Mode*, then issue the ***FPD*** command as follows:

Type: ***FPD sss <ent>***
Where: sss = seconds of delay in 10ms increments

The equipment responds with the ***FPD*** message reflecting the delay entered. The front porch delay is the period of time between the activation of the PTT signal (push to talk - Communication Interface Connector Pin 4) and the beginning of the data transmission. This period of time can be set to a value in the range of 0 to 990 ms. The PTT signal is used to key radio transmitters and the delay is used to guarantee a minimum period of time for the transmitter audio to settle before the data transmission begins.

4.10 HELP OR ? COMMAND

The ***HELP*** command lists the commonly used commands used by the TimeBurst and TimeBridge service ports. ***HELP*** is available by using the following commands:

Type: ***HELP <ent>***
- OR -
? <ent>

Response: [a/b] a or b is optional
cmac
dal [P/L]
dcl [P/L]
date [yyyy-mm-dd]
def **(TimeBurst only)**
echo on/off
flash page
mr on/off
sm on/off
stat
time [hh:mm:ss]
tm on/off
tstat
tx test on/off **(TimeBurst only)**
ver

FOR FURTHER INFORMATION PLEASE CONSULT YOUR MANUAL

Command syntax help can be obtained by issuing the command in question immediately followed by a question mark (?). Not all commands have this feature.

Type: ***DATE? <ent>***

Response: DISPLAY OR SET DATE
USAGE
DATE<ent> to DISPLAY
DATE yyyy-mm-dd<ent> to SET
yyyy=year(eg.1997), mm=month, dd=day of month
set mode must be enabled to set (SM ON)

4.11 MR - MODEM REPORT ON/OFF COMMAND

The command MR will display the last Modem Report. The command MR ON/OFF will enable or disable the real time display of the modem communications activity. This display is used to monitor the modem communications reception and data content of the TimeBridge and the modem communications activity of the TimeBurst. In order for these commands to function, the test mode must be enabled with the TM ON command.

Type: ***TM ON <ent>***
Response: TEST MODE ENABLED

Type: ***MR<ent>*** *(*to display the last Modem Report)
Response: (SEE CORRESPONDING EXAMPLES BELOW)

Type: ***MR ON <ent>*** (to enable the real time reporting)
Response: MODEM ACTIVITY REPORT ENABLED

Type: ***MR OFF <ent>*** (to disable the real time reporting)
Response: MODEM ACTIVITY REPORT DISABLED

An example of a received communications from the TimeBridge is shown below:

MODEM REPORT
SEQ 140
ERROR-NONE
SYNC-IN
DATE= 97-10-01
TIME=14:11:20.25
WDAY 4
YDAY 274
TZ 005
DST D

The following are definitions of the data contained in the report.

	Communications message
SEQ	Sequence (0-255)
ERROR	Errors NONE/CRC
SYNC	Synchronization Character
DATE	Date
TIME	Time
WDAY	Week Day
YDAY	Year Day
TZ	Time Zone Number (0-23)
DST	Daylight Saving Time Character

An example of transmitted communications from the TimeBurst is shown below:

MODEM REPORT
SEQ 141
SYNC-IN
DATE= 97-01-03
TIME=14:01:00.00
WDAY 6
YDAY 351
TZ 05
DST S

The following are definitions of the data contained in the report.

	Communications message
SEQ	Sequence (0-255)
SYNC	Synchronization Character
DATE	Date
TIME	Time
WDAY	Week Day
YDAY	Year Day
TZ	Time Zone Number (0-23)
DST	Daylight Saving Time Character

4.12 MSTAT - MODEM STATUS AND CLEAR MODEM COUNTERS (TIMEBRIDGE ONLY)

The command, MSTAT is used to display the status of the modem communications activity counters. These counters are incremented on every transition of various modem and communications events. A list of these events are shown below along with a description.

Type: ***MSTAT <ent>***

Response:
COMPOSITE INTR CNTR=65535
TIMER INTR CNTR=65535
SYNTH WORD INTR CNTR=65535
DATA INTR CNTR=65535
GOOD CRC CNTR=65535
BAD CRC CNTR=00004
GOOD MSG SEQ CNTR=58025
COMPLETE MSG CNTR=56421
POST ENCRYPT.FAIL CNTR=01604
BAD MSG CNTR=00000

To clear all of the above counters use the **CMAC** command.

Type: ***CMAC*** <***ent***>

Response: MODEM INTERRUPT COUNTERS CLEARED

COMPOSITE INTR CNTR	Composite Interrupt Counter - Will increment on every occurrence of any of the modem interrupts.
TIMER INTR CNTR	Timer Interrupt Counter - Will increment on every occurrence of the modem timer interrupt.
SYNTH WORD INTR CNTR	Synth Word Interrupt Counter - Will increment on every occurrence of the modem synth word received interrupt.
DATA INTR CNTR	Data Interrupt Counter - Will increment on every occurrence of the modem receiving a data byte interrupt.
GOOD CRC CNTR	Good CRC Interrupt Counter - Will increment on every occurrence of the modem receiving a valid CRC interrupt.
BAD CRC CNTR	Bad CRC Interrupt Counter - Will increment on every occurrence of the modem receiving an invalid CRC interrupt.
GOOD MSG SEQ CNTR	Good Message Counter - Will increment on every occurrence of the modem receiving a good message sequence.
COMPLETE MSG CNTR	Complete Message Counter - Will increment on every occurrence of the modem receiving a valid and complete message sequence.
POST ENCRYPT.FAIL CNTR	Post Encryption Fail Counter - Will increment on every occurrence of the modem determining a failed post encryption operation.
BAD MSG CNTR	Bad Message Counter - Will increment on every occurrence of the modem receiving an invalid and bad message sequence.

4.13 SET PAGE TO 1 / SET PAGE TO 2 COMMANDS

These commands are used to establish the current operating (flash code) memory page. The TimeBurst and TimeBridge units have remote programming capability that is used to update the code flash memory. This is safely accomplished by establishing two separate memory pages. One of these memory pages is selected as the current page, while the other page is used for updating its code. This selection can be accomplished by using these commands. This command requires test mode to be enabled.

Type: ***TM ON <ent>***
Response: TEST MODE ENABLED

Type: ***SET PAGE TO 1 <ent>***
Response: FLASH MEMORY PAGE SET TO 1

Sample Response: SPECTRACOM TIME BRIDGE, S/W VERSION 1.00 10/01/97
IRIG-RS485 S/W VERSION 1.00

When the command is issued, the flash memory page will be changed and the equipment will automatically begin a hardware reset sequence. This entire process will take several seconds to complete.

4.14 SM - SET MODE COMMANDS, SM ON / SM OFF

This command is used to read or enter *Set Mode* operation. As a safeguard, the unit must be placed into *Set Mode* whenever operational parameters are entered. The unit "times out" of *Set Mode* and returns to *Read Mode* operation if no commands are issued for 15 minutes. To read the *Set Mode* status (ON or OFF), issue the ***SM*** command as shown below:

Type: ***SM <ent>***
Response: SET MODE ENABLED
or
SET MODE DISABLED

To place the unit into *Set Mode*:

Type: ***SM ON <ent>***
Response: SET MODE ENABLED

To return the unit to *Read Mode*:

Type: ***SM OFF <ent>***
Response: SET MODE DISABLED

The commands that require the use of set mode are BPD, DATE (when setting or changing), DEF, FPD and TIME (When setting or changing).

4.15 STAT - STATUS COMMAND

The ***STAT*** command provides the current UTC time and date, sync status, day of the year alarm relay status. To display the operational status, issue the ***STAT*** command as follows:

An example of the response from the TimeBridge is shown below:

Type: ***STAT <ent>***

Example Response:
```
TIME=14:41:50 DATE=1997-01-03
DAY OF YEAR=351
DAY OF WEEK=FRI
SYNC-IN
ALARM RELAY-OFF
```

An example of the response from the TimeBurst is shown below:

Type: ***STAT <ent>***

Example Response:
```
TIME=14:37:30 DATE=1997-01-03
DAY OF YEAR=351
DAY OF WEEK=FRI
SYNC=IN , FORMAT= 0, BAUD=9600
ALARM=INACTIVE
REMOTE PROMPT INPUT=INACTIVE
BUSY INPUT=INACTIVE
TIME ZONE=05, DST=S
```

4.16 TIME COMMAND

The command, ***TIME***, reads or sets the time. The TimeBurst and the TimeBridge always maintain the current time. This is accomplished with a solid state real time clock. The real time clocks are updated periodically on both units. The TimeBurst clock is updated when connected to a master clock with the master clock time data. The Timebridge is updated when receiving communications from a synchronized TimeBurst with the TimeBurst time data. The time can be set using this command, but it will be over written when the units are connected to the appropriate master clock or receiving synchronized communications as with the TimeBridge. This command is normally used to initialize the time.

The response to this command is not synchronized in any way to the real time. The current time is displayed in an asynchronous fashion.

To display the current UTC time, issue the ***TIME*** command as shown below:

Type:	***TIME <ent>***
Response:	TIME = HH:MM:SS
Where:	HH = hours 00...23
	MM = Minutes 00...59
	SS = Seconds 00...60

To set the time, place the clock in *Set Mode* and issue the ***TIME*** command as follows:

Type:	***SM ON <ent>***
Response:	SET MODE ENABLED
Type:	***TIME HH:MM:SS <ent>***
Where:	***HH:MM:SS*** = As defined above.
Response:	Time message reflecting the time entered.

*NOTE**: Both the TimeBurst and TimeBridge time will be over written by the data being received.***

Example: Manually set the TIME to 13:45:00.

Type:	***SM ON <ent>***
Response:	SET MODE ON
Type:	***TIME 13:45:00 <ent>***
Response:	TIME = 13:45:00

4.17 TIME ON/OFF COMMAND

These commands will enable and disable the real time reporting of the current time. The current time is reported every second. To turn off the real time reporting, use the TIME OFF command. Test Mode must be enabled for this command to function.

Type: ***TM ON <ent>***
Response: TEST MODE ENABLED

Type: ***TIME ON <ent>***
Example Response: TIME is 16:09:53

TIME is 16:09:54

TIME is 16:09:55

TIME is 16:09:56

4.18 TM - TEST MODE COMMANDS, TM ON / TM OFF

This command is used to read or enter *Test Mode* operation. *Test Mode* commands are used in factory testing and field trouble shooting. The equipment "times out" of *Test Mode* and returns to *Read Mode* operation if no commands are issued for 15 minutes. The alarm is asserted whenever the equipment is in *Test Mode*.

To read the *Test Mode* status (ON or OFF), issue the ***TM*** command as shown below:

Type: ***TM <ent>***
Response: TEST MODE ENABLED
- OR -
TEST MODE DISABLED

To place the equipment into *Test Mode* operation, issue the ***TM*** command as follows:

Type: ***TM ON <ent>***
Response: TEST MODE ENABLED

The commands that require the use of test mode are MR, MR ON/OFF, SET PAGE TO 1/SET PAGE TO 2, TIME ON/OFF AND TX TEST ON/OFF.

4.19 TSTAT - TEST STATUS COMMAND

The ***TEST STATUS*** command provides the status of the TimeBurst and TimeBridge hardware/software at time of reset and the current dip switch settings and IRIG code version.

To retrieve the operational status, issue the **T*STAT*** command as follows. An example of the response from the TimeBridge is shown below:

Type: ***TSTAT <ent>***

Example Response:

```
RESET
[YES]IRIG/RS485 OK
[YES]ERAM OK
[YES]IRAM OK
[YES]MODEM OK
[YES]SWATCH OK
[YES]CODE CHECKSUM OK
[YES]IREG. OK
[YES]COM LOG CHECKSUM OK
[YES]1PPS OK
FLASH PAGE=11
CURRENT
DIP SWITCH(1-10 ON=1>0011100000
IRIG VER=01-00
```

An example of the response from the TimeBurst is shown below:

Type: ***TSTAT <ent>***

Example Response:

```
RESET
   [YES]RS485
[YES]ERam
[YES]IRam
[YES]Modem
[YES]SWATCH
[YES]Code Checksum
[YES]IReg
FLASH PAGE=22
Current
Dip Sw.(2-9  on=1)=00010000
Dip Sw.(1-4)=1011
Rot Sw.(10msec)=0
Rot Sw.(100msec)=0
Prompt=0,Busy=0
```

4.20 TX TEST ON/OFF - TRANSMIT CONTINUOUS BURST (TIMEBURST ONLY)

This command enables the modem to send a continuous tone. This action will enable the audio output of the 8185 so that the deviation level adjust potentiometer can be adjusted to the appropriate level. This test action is used for setting the deviation on a FM radio where input tones are required to measure deviation. In this case where the output of the 8185 is connected to the microphone of a radio that is utilizing an audio limiter, the output level can be set to the recommended voltage.

The audio output will continue until Test Mode times out after fifteen minutes or a scheduled Burst occurs. If the DIP switches are configured for the default of every 10 seconds and this is not enough time, change the schedule for the Burst for greater than 15 minutes. If a voltage is not recommended, set the voltage to the default setting of 1 volt p-p. This command requires Test Mode enabled.

To enable a continuous tone output:

Type: ***TM ON <ent>***
Response: TEST MODE ENABLED
Type: ***TX TEST ON <ent>***
Response: MODEM TRANSMITTER ENABLED

To disable the continuous tone output:

Type: ***TM ON <ent>***
Response: TEST MODE ENABLED
Type: ***TX TEST OFF <ent>***
Response: MODEM TRANSMITTER DISABLED

4.21 VER - VERSION COMMAND

This command provides all the software version levels of the programs contained in the TimeBurst and TimeBridge units, and the time and date the unit was first powered on. To retrieve version information:

Type: **VER <ent>**
Response: (SEE CORRESPONDING EXAMPLES BELOW)

TimeBridge: SPECTRACOM TIME BRIDGE, S/W VERSION 1.3.0 10/01/97
IRIG-RS485 S/W VERSION 1.01

TimeBurst: SPECTRACOM TIME BURST, S/W VERSION 1.2.0 10/27/99

SECTION 5 OPTIONS AND ACCESSORIES

OPTIONS AND ACCESSORIES

5.0 INTRODUCTION

This section describes the options and accessories available for the TimeBurst and TimeBridge units.

5.1 OPTION 1: INTERNATIONAL POWER SUPPLY

Units with this option receive a tabletop AC adapter in place of the standard wall mount adapter. The International Power Supply operates over a wide voltage and line frequency range to allow operation nearly anywhere in the world.

The optional power adapter is shipped with a detachable line cord. The supplied line cord is compatible with AC receptacles (NEMA 5-15R) commonly found in the United States and Canada. Alternate type line cords or adapters may be obtained locally.

Specifications:

Input Voltage:	90-240 VAC
Line Frequency:	47-63 Hz
Power:	20 watts
DC Connector:	Barrel, 5.5 mm OD, 2.1 mm ID
DC Polarity:	Positive shell, negative center

APPENDIX A IRIG CODE DESCRIPTION

IRIG CODE DESCRIPTION

A.0 INTRODUCTION

this Appendix contains a detailed description of the IRIG (Inter-Range Instrumentation Group) codes the TimeBridge can provide. The TimeBridge can be configured to output IRIG B or IRIG E codes in AM (amplitude modulated) and pulse width coded formats, as detailed in Section A.3. In addition, the IRIG outputs may be configured with signature control; see A.4 below. The time contained in the IRIG output can be configured to reflect Universal Coordinated Time (UTC) or local time, with or without daylight saving time corrections.

A.1 IRIG B OUTPUT

The IRIG B code contains the Binary Coded Decimal (BCD) time of year, Control Function (CF) field and the Straight Binary Seconds (SBS) time of day. Figure A-1 illustrates the IRIG B data structure. The BCD time of year provides the day of the year, 1-366, and the time of day including seconds. The hour of the day is expressed in 24 hour format. The SBS time is the number of seconds elapsed since midnight. The Control Function field contains year information and a time sync status bit.

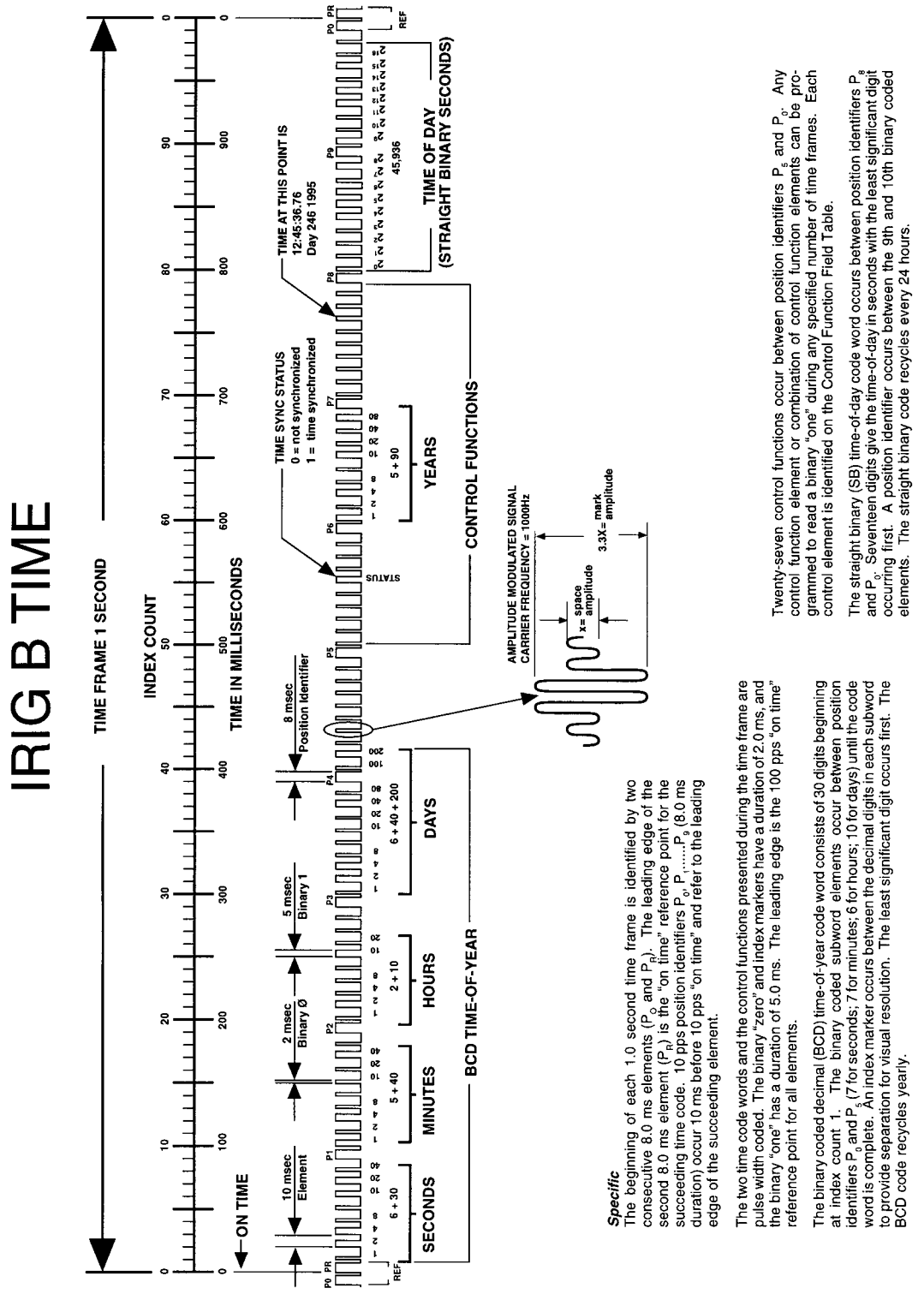
A.1.1 IRIG B General Description

1. Time frame: 1.0 seconds.

2. Code digit weighting:

   A. Binary Coded Decimal time-of-year.
   Code word - 30 binary digits.
   Seconds, minutes, hours, and days.
   Recycles yearly.

   B. Straight Binary Seconds time-of-day.
   Code word - 17 binary digits.
   Seconds only, recycles daily.



Specific

The beginning of each 1.0 second time frame is identified by two consecutive 8.0 ms elements (P_O and P_R). The leading edge of the second 8.0 ms element (P_R) is the "on time" reference point for the succeeding time code. 10 pps position identifiers P_0, P_1.....P_9 (8.0 ms duration) occur 10 ms before 10 pps "on time" and refer to the leading edge of the succeeding element.

The two time code words and the control functions presented during the time frame are pulse width coded. The binary "zero" and index markers have a duration of 2.0 ms, and the binary "one" has a duration of 5.0 ms. The leading edge is the 100 pps "on time" reference point for all elements.

The binary coded decimal (BCD) time-of-year code word consists of 30 digits beginning at index count 1. The binary coded subword elements occur between position identifiers P_0 and P_5 (7 for seconds; 7 for minutes; 6 for hours; 10 for days) until the code word is complete. An index marker occurs between the decimal digits in each subword to provide separation for visual resolution. The least significant digit occurs first. The BCD code recycles yearly.

Twenty-seven control functions occur between position identifiers P_5 and P_0. Any control function element or combination of control function elements can be programmed to read a binary "one" during any specified number of time frames. Each control element is identified on the Control Function Field Table.

The straight binary (SB) time-of-day code word occurs between position identifiers P_4 and P_9. Seventeen digits give the time-of-day in seconds with the least significant digit occurring first. A position identifier occurs between the 9th and 10th binary coded elements. The straight binary code recycles every 24 hours.

Figure A-1 IRIG B Time Code

3. Code word structure:

BCD: The BCD time-of-year code word consists of 30 digits beginning at index count 1. Binary coded elements occur between position identifier elements P_0 and P_5 (7 for seconds, 7 for minutes, 6 for hours, and 10 for days) until the code word is complete. An index marker occurs between decimal digits in each group to provide separation for visual resolution. Least significant digit occurs first.

CF: IRIG formats reserve a set of elements known as Control Functions (CF) for the encoding of various control, identification, or other special purpose functions. IRIG B has 27 Control Functions located between elements 50 and 78. The TimeBurst uses the Control Functions to encode year information and time sync status.

Table A-1 lists the Control Function Field and the function of each element.

Element 55 is the time sync status bit. Element 55 is a Binary 1 when the front panel time sync lamp is green, and a Binary 0 when the lamp is red.

Year information consists of the last two digits of the current year (i.e. 97, 98, 99 etc.). Elements 60 through 63 contain the binary equivalent of year units. Elements 65 through 68 contain the binary equivalent of tens of years. In keeping with IRIG formats, the least significant bit occurs first. All unused Control Functions are filled with a space (Binary 0).

SBS: Word begins at index count 80. Seventeen Straight Binary Coded elements occur with a position identifier between the 9th and 10th binary coded elements. The least significant digit occurs first.

4. Pulse rates:

A. Element rate: 100 per second.

B. Position identifier rate: 10 per second.

C. Reference marker rate: 1 per second.

5. Element identification: The "on time" reference point for all elements is the pulse leading edge.

   A. Index marker (Binary 0 or uncoded element): 2 millisecond duration.

   B. Code digit (Binary 1): 5 millisecond duration.

   C. Position identifier: 8 millisecond duration.

   D. Reference marker, 1 per second. The reference marker appears as two consecutive position identifiers. The second position identifier marks the on-time point for the succeeding code word.

6. Resolution:

   Pulse width coded signal: 10 milliseconds.

   Amplitude modulated signal: 1 millisecond.

7. Carrier frequency: 1 kHz when modulated.

ELEMENT #	C.F. DIGIT #	FUNCTION
50	1	Space
51	2	Space
52	3	Space
53	4	Space
54	5	Space
55	6	Time Sync Status
56	7	Space
57	8	Space
58	9	Space
59	PID P6	Position Identifier
60	10	Years Units Y1
61	11	Years Units Y2
62	12	Years Units Y4
63	13	Years Units Y8
64	14	Space
65	15	Years Tens Y10
66	16	Years Tens Y20
67	17	Years Tens Y40
68	18	Years Tens Y80
69	PID P7	Position Identifier
70	19	Space
71	20	Space
72	21	Space
73	22	Space
74	23	Space
75	24	Space
76	25	Space
77	26	Space
78	27	Space

Table A-1 IRIG B Control Function Field

A.2 IRIG E OUTPUT

The IRIG E code contains the Binary Coded Decimal (BCD) time of year and Control Functions. Figure A-2 illustrates the IRIG E data structure. The BCD time of year provides the day of year, 1-366, and time of day to tens of seconds. The hour of the day is expressed in 24 hour format. The Control Function field includes a time sync status bit, year information and Straight Binary Seconds (SBS) time of day.

A.2.1 IRIG E General Description

1. Time frame: 10 seconds.

2. Code Digit Weighting:
   Binary Coded Decimal time of year.
   Code word - 26 binary digits.
   Tens of seconds, minutes, hours, and days.
   Recycles yearly.

3. Code Word Structure: The BCD time-of-year code word consists of 26 digits beginning at index count 6. Binary coded elements occur between position identifier elements P_0 and P_5 (3 for seconds, 7 for minutes, 6 for hours, and 10 for days) until the code word is complete. An index marker occurs between decimal digits in each group to provide separation for visual resolution. The least significant digit occurs first.

4. Control Functions: IRIG formats reserve a set of elements known as Control Functions (CF) for the encoding of various control, identification, or other special purpose functions. IRIG E has 45 Control Functions located between elements 50 and 98. The TimeBurst uses the Control Function field to encode year data, time sync status, and SBS time data. Table A-2 lists the Control Function Field and each element's function.

   Element 55 is the time sync status bit. Element 55 is a Binary 1 when the front panel time sync lamp is green, and a Binary 0 when the lamp is red.

   Year information consists of the last two digits of the current year (i.e. 96, 97, etc.). Elements 60 through 63 contain the binary equivalent of year units. Elements 65 through 68 contain the binary equivalent of tens of years. In keeping with IRIG formats, the least significant bit occurs first.

   Elements 80 through 97 are encoded with the Straight Binary Seconds (SBS) time data. The SBS time data is incremented in 10-second steps and recycles every 24 hours.

IRIG E TIME

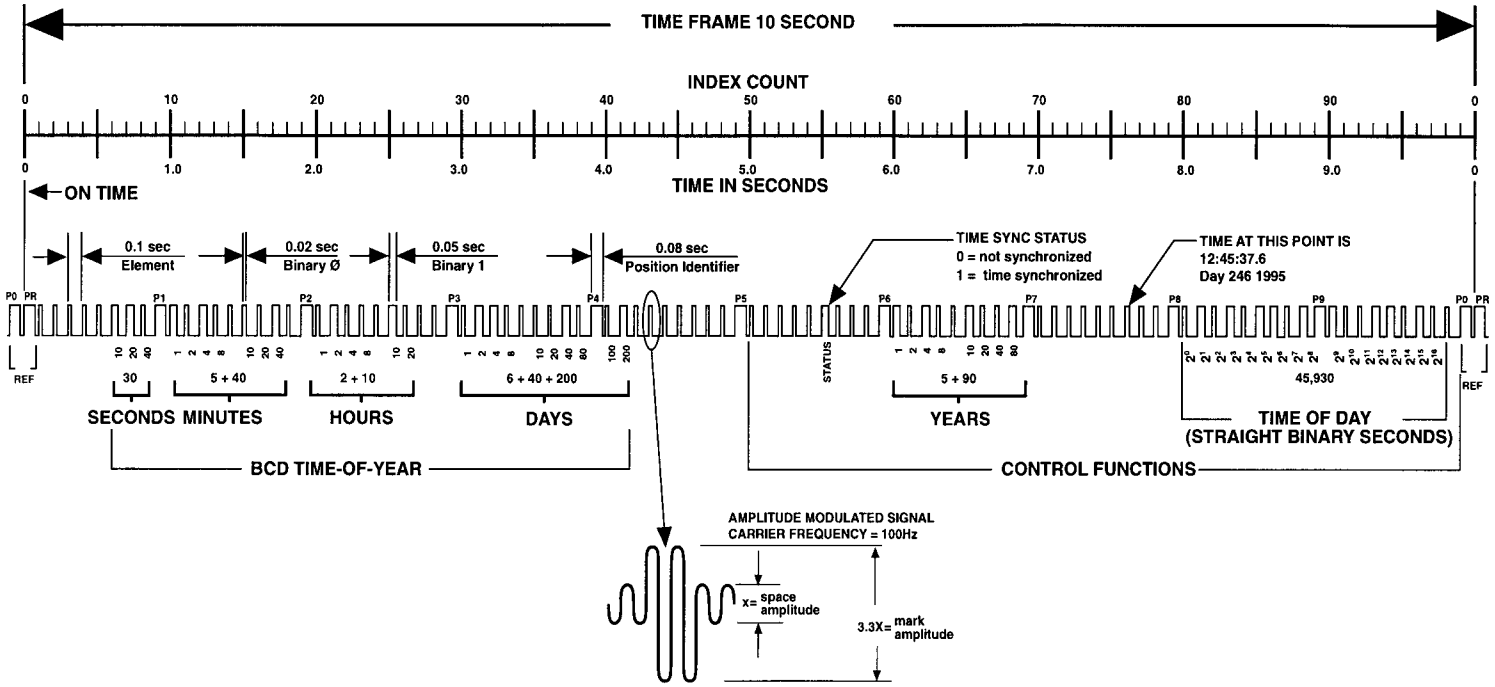


Figure a-2 IRIG E Time Code

Specific

The beginning of each 10 second time frame is identified by two consecutive 80 ms elements (P_0 and P_R). The leading edge of the second 80 ms element (P_R) is the "on time" reference point for the succeeding time code. 1 pps position identifiers P_0, P_1.....P_9 (80 ms duration) occur 0.1 second before 1 pps "on time" and refer to the leading edge of the succeeding element.

The time code word and the control functions presented during the time frame are pulse width coded. The binary "zero" and index markers have a duration of 20 ms, and the binary "one" has a duration of 50 ms. The leading edge is the 10 pps "on time" reference point for all elements.

The binary coded decimal (BCD) time-of-year code word consists of 26 digits beginning at index count 6. The binary coded subword elements occur between position identifiers P_0 and P_5 (3 for seconds; 7 for minutes; 6 for hours; 10 for days) until the code word is complete. An index marker occurs between the decimal digits in each subword to provide separation for visual resolution. The least significant digit occurs first. The BCD code recycles yearly.

Forty-five control functions occur between position identifiers P_5 and P_0. Any control function element or combination of control function elements can be programmed to read a binary "one" during any specified number of time frames. Each control element is identified on the Control Function Field Table.

5. Pulse rates:

   A. Element rate: 10 per second.

   B. Position identifier rate: 1 per second.

   C. Reference marker rate: 1 per 10 seconds.

6. Element identification: The "on time" reference point for all elements is the pulse leading edge.

   A. Index marker (Binary 0 or uncoded element): 20 millisecond duration.

   B. Code digit (Binary 1): 50 millisecond duration.

   C. Position identifier: 80 millisecond duration.

   D. Reference marker: 80 millisecond duration, 1 per 10 seconds. The reference marker appears as two consecutive position identifiers. The second position identifier or reference marker is the on-time point for the succeeding code word.

BIT #	CF ELEMENT #	FUNCTION
50	1	SPACE
51	2	SPACE
52	3	SPACE
53	4	SPACE
54	5	SPACE
55	6	TIME SYNC STATUS
56	7	SPACE
57	8	SPACE
58	9	SPACE
59	PID P6	POSITION IDENTIFIER
60	10	YEAR UNITS Y1
61	11	YEAR UNITS Y2
62	12	YEAR UNITS Y4
63	13	YEAR UNITS Y8
64	14	SPACE
65	15	YEAR TENS Y10
66	16	YEAR TENS Y20
67	17	YEAR TENS Y40
68	18	YEAR TENS Y80
69	PID P7	POSITION IDENTIFIER
70	19	SPACE
71	20	SPACE
72	21	SPACE
73	22	SPACE
74	23	SPACE
75	24	SPACE
76	25	SPACE
77	26	SPACE
78	27	SPACE
79	PID P8	POSITION IDENTIFIER
80	28	SBS 2^0
81	29	SBS 2^1
82	30	SBS 2^2
83	31	SBS 2^3
84	32	SBS 2^4
85	33	SBS 2^5
86	34	SBS 2^6
87	35	SBS 2^7
88	36	SBS 2^8
89	PID P9	POSITION IDENTIFIER
90	37	SBS 2^9
91	38	SBS 2^{10}

92 39 SBS 2^{11}
93 40 SBS 2^{12}
94 41 SBS 2^{13}
95 42 SBS 2^{14}
96 43 SBS 2^{15}
97 44 SBS 2^{16}
98 45 SPACE
99 PID P0 POSITION IDENTIFIER

Table A-2 IRIG E Control Function Field

A.3 CHANGING THE IRIG CODE OUTPUT OF THE TIMEBRIDGE

IRIG code output in B or E format can be selected using the DIP switches on the rear panel of the TimeBridge, as shown in Table A-3 and Figure A-3 below.

Switch Number	Off		On	
1	IRIG B		IRIG E	
2	100 Hz IRIG AM Carrier		1000 Hz IRIG AM Carrier	
3	IRIG Signature Off		IRIG Signature On	
4	Spare			
5	RS-485 Format 0		RS-485 Format 1	
Switch	RS-485 Baud Rate			
	1200	2400	4800	9600
6	Off	Off	On	On
7	Off	On	Off	On
8	Spare			
9	Spare			
10	Spare			

Table A-3 DIP Switch Assignments - TimeBridge

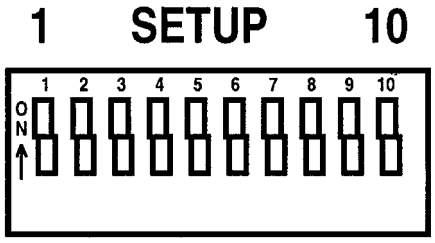


Figure A-3 Set-Up DIP Switches - TimeBridge

A.4 SIGNATURE CONTROL

A Signature Control feature may be enabled for any IRIG output. Signature Control removes the modulation code when a Time Sync Alarm is asserted. To enable Signature Control use DIP switch #3 as noted in Table A-3 above.

APPENDIX B TIMEBURST SPECIFICATIONS

TIMEBURST SPECIFICATIONS

B.0 MODEL 8185 TIMEBURST SPECIFICATIONS

B.1 MODEM

Signaling protocol:	Spectracom proprietary.
Signaling interface:	Analog 300 - 3000 Hz bandwidth, transformer coupled.
Output impedance:	600 ohm balanced.
Modem sensitivity:	-9 dBm to +10.0 dBm.
Timing accuracy:	<250 milliseconds.
Interface connector:	8-pin removable terminal strip (supplied).

B.2 STATUS INDICATORS

Front panel bi-color Time Sync LED:

Indicates operational status of instrument:

Green = TimeBurst synchronized to the Master Clock.

Red = TimeBurst is not synchronized and time data accuracy does not meet specifications.

Prompt: Lights when a burst is being transmitted.

B.3 RS-232 SERIAL COMMUNICATION SERVICE PORT

Signal:	RS-232 levels when interrogated by the connected device.
Connector:	DB9 female, pin assignments conform to EIA/TIA-574 standard, data communication equipment (DCE). Flow control not required.
Character Structure:	ASCII, 1 start, 8 data, 1 stop, no parity.
Configuration:	Baud rate and output data formats are fixed: 9600 baud, 8 data bits, 1 stop bit, no parity.

B.4 RS-485 REMOTE INPUT/OUTPUT

Signal:	Selected data format in RS-485 levels, output once per second.
Connector:	One (1) removable 3-position terminal block (supplied).
Character Structure:	ASCII, 1 start, 8 data, 1 stop, no parity.
Accuracy:	Data stream on time marker within ±100 milliseconds of UTC at 9600 baud, Formats 0 and 1.
Configuration:	Baud rate and output data formats are selected using DIP switches. Bit rate selections are 300, 600, 1200, 2400, 4800, and 9600 baud. Format 0 only.

B.5 ALARM OUTPUT

A single Alarm relay is provided for remote monitoring of operational status. Alarm status is also included in performance and status logs obtained through the RS-232 Service Port.

B.5.1 Alarm Operation

Major Alarm: A Major Alarm is asserted when detected faults compromise output accuracy. The alarm relays reset when the fault condition is corrected. Faults and conditions listed below will actuate a Major Alarm:

On-Time Point Error:	Measured oscillator on-time point exceeds 100 msec.
Time Sync:	The period of time allotted for operation without receiving a communications burst from Master Clock has expired.
CPU Fault:	Critical hardware failure.
Test Mode:	Unit has been placed in Test Mode operation.
Power Failure:	The TimeBridge has lost power.

B.5.2 Alarm Interface

Alarm Outputs:	Time Sync and Power.
Relay Contacts:	NO, NC and common.
Contact Rating:	30 VDC, 2 A.
Connector:	4-position terminal block (supplied).

B.6 INPUT POWER

AC Input:	115 VAC ±10%, 60 Hz, 8 W.
DC Input:	12 to 36 VDC, 5 W.
Connector:	Barrel, 5.5mm OD, 2.1mm ID.
Polarity:	Positive shell, negative center.
Optional Power:	Option 1, International Power Supply, operates from a 90 to 240 VAC, 47 to 63 Hz power line.

B.7 MECHANICAL AND ENVIRONMENTAL

Dimensions:	1.75 H x 19.0 W x 10.0 D inches. (44.5 H x 482.6 W x 254 D mm).
Rack mount:	EIA 19”, front panel mounting holes for one standard rack unit.
Weight:	6 lbs (2.7 kg).
Temperature:	32° to 122° F/0 to 50 °C operating range.

APPENDIX C TIMEBRIDGE SPECIFICATIONS

TIMEBRIDGE SPECIFICATIONS

C.0 MODEL 8186 TIME BRIDGE SPECIFICATIONS

C.1 MODEM

Signaling Protocol:	Spectracom proprietary.
Signaling Interface:	Analog 300 - 3000 Hz bandwidth, transformer coupled.
Input Impedance:	600 ohm balanced.
Acquisition Time:	One valid Communications Packet - depends on TimeBurst burst rate setting.
Modem Sensitivity:	-9 dBm to +10.0 dBm.
Timing Accuracy:	<250 milliseconds.
Interface Connector:	5-pin removable terminal strip (supplied).

C.2 STATUS INDICATORS

Front panel bi-color Time Synch LED:

Indicates operational status of instrument:

Green = Time Bridge synchronized to the Master Clock through the Time Burst.

Red = Time Bridge is not synchronized and time data accuracy does not meet specifications.

Blinking: Received data burst.

Flashing Red: Failure.

Off: Loss of power.

C.3 RS-232 SERIAL COMMUNICATION SERVICE PORT

Signal:	RS-232 levels when interrogated by the connected device.
Connector:	DB9 female, pin assignments conform to EIA/TIA-574 standard, data communication equipment (DCE). Flow control not required.
Character Structure:	ASCII, 1 start, 8 data, 1 stop, no parity.
Configuration:	Baud rate and output data formats are fixed: 9600 baud, 8 data bits, 1 stop bit, no parity.

C.4 RS-485 REMOTE OUTPUT

Signal:	Selected data format in RS-485 levels, output once per second.
Connector:	One (1) removable 3-position terminal block (supplied).
Character Structure:	ASCII, 1 start, 8 data, 1 stop, no parity.
Accuracy:	Data stream on time marker within ±100 milliseconds of UTC at 9600 baud, Formats 0 and 1.
Configuration:	Baud rate and output data formats are selected using DIP switches. Bit rate selections are 300, 600, 1200, 2400, 4800, and 9600 baud. There are two data format selections available: Format 0 and Format 1.

C.5 IRIG AM OUTPUT

Signal:	IRIG B or IRIG E, Amplitude Modulated sinewave output. IRIG B: 1000 Hz carrier. IRIG E: 100 Hz or 1000 Hz carrier.
Signal Level:	Adjustable with a rear panel potentiometer from 0.0 to 10.0 V p-p mark amplitude into 600 ohms or greater.
Connector:	BNC female.
Output Options:	Irig B or Irig E, Carrier frequency and Signature control are selected using rear panel DIP switches.
Signature Control:	Removes the modulation code from the IRIG output whenever the selected alarm condition is present. The output is restored when the fault is corrected.

C.6 IRIG TTL OUTPUT

Signal:	IRIG E, Pulse Width Modulated TTL compatible output.
Signal Level:	High > 2.0V, Low < 0.8V. Not affected by the rear panel potentiometer.
Connector:	BNC female.
Output Options:	Signature control is selected using rear panel DIP switches.
Signature Control:	Removes the modulation code from the IRIG output whenever the selected alarm condition is present. The output is restored when the fault is corrected.

C.7 ALARM OUTPUT

A single Alarm relay is provided for remote monitoring of operational status. Alarm status is also included in performance and status logs obtained through the RS-232 Service Port.

C.7.1 Alarm Operation

Major Alarm: A Major Alarm is asserted when detected faults compromise output accuracy. The alarm relays reset when the fault condition is corrected. Faults and conditions listed below will actuate a Major Alarm:

On-Time Point Error:	Measured oscillator on-time point exceeds 100 msec.
Time Sync:	The period of time allotted for operation without receiving a communications burst has expired.
CPU Fault:	Critical hardware failure.
Test Mode:	Unit has been placed in Test Mode operation.
Power Failure:	The TimeBridge has lost power.

C.7.2 Alarm Interface

Alarm Outputs:	Time Sync and Power.
Relay Contacts:	NO, NC and common.
Contact Rating:	30 VDC, 2 A.
Connector:	4-position terminal block (supplied).

C.8 INPUT POWER

AC Input:	115 VAC ±10%, 60 Hz, 8 W.
DC Input:	12 to 36 VDC, 5 W.
Connector:	Barrel, 5.5mm OD, 2.1mm ID.
Polarity:	Positive shell, negative center.
Optional Power:	Option 1, International Power Supply, operates from a 90 to 240 VAC, 47 to 63 Hz power line.

C.9 MECHANICAL AND ENVIRONMENTAL

Dimensions:	2.0 H x6.0 W x 7.0 D inches. (50.8 H x 152.57 W x 177.99 D mm).
Rack mount:	EIA 19” x 3.5”H with front panel mounting holes.
Weight:	2 lbs (0.9 kg).
Temperature:	32° to 122° F / 0° to 50°C operating range.