

# BAT ELECTRONICS

VRL-1

INSTRUCTION MANUAL

DIGITAL SERVICE UNIT

**ARC Electronics**  
800-926-0226

## TABLE OF CONTENTS

	Page
INITIAL SELF TEST.....	1
INSTALLATION .....	2
DIP SWITCH SETTINGS.....	2
TEST AND DIAGNOSTICS .....	3
TESTING .....	4
Self Test	
Line Test	
TESTING (continued) .....	5
Digital Loop	
Remote Test	
TELCO TESTING .....	6
CSU Loop	
DSU Loop	
CONNECTOR PIN OUTS.....	7
Line Interface	

The BAT Electronics VRL-11 is a simple trouble free CSU/DSU that should not present a user much difficulty during installation or use. We do request that you read this manual to get you familiar with the product. The first thing you should do is run this simple and quick self test.

### INITIAL SELF TEST

1. Please do not forget to plug the VRL-1 in. Just plug the transformer into any 110 volt A.C. receptacle and the coaxial connector into the back of the unit.
2. Do not connect the telco line or terminal equipment yet.
3. Observe the front panel LEDs. There are two groups. The left group monitors the interfaces, while the right group displays the test mode.
4. With the transformer plugged in and nothing connected the INS LED blinks , while all of the LEDs in the right group are off. This is the **normal** condition on power-up.
5. Push the **mode selector** button **once**. You are now in the self test mode. The **first LED** in the right group will blink red. After about seconds the LED will start blinking green.
6. That is it! Your VRL-1 checks out and is ready for connection to the telco circuit and the terminal equipment as soon as you take it out of the test mode. To take it out of the test mode push the mode selector momentarily until all of the test mode (right group) LEDs are off.

## INSTALLATION

Installation is simple. Line rate can be automatically selected or manually set. The Adaptive Distance Equalization circuitry compensates for distance and line quality automatically eliminating the need for adjustments. Installation is simply a matter of plugging in the power transformer, connecting the terminal to the terminal connector and the telco connector to the telco jack. Please note that the VRL-1 has both V.35 and RS-232 connectors supplied. Make certain that you are using the proper terminal interface and cable. The BAT Electronics VRL-1 is supplied with the approved RJ-48s modular jack. Your installation may have a different TELCO jack. For your information the BAT RJ-48s is wired as follows: Transmit Pair Pins 1,2, Receive Pair Pins 7,8. After you make the TELCO connection, your installation is complete.

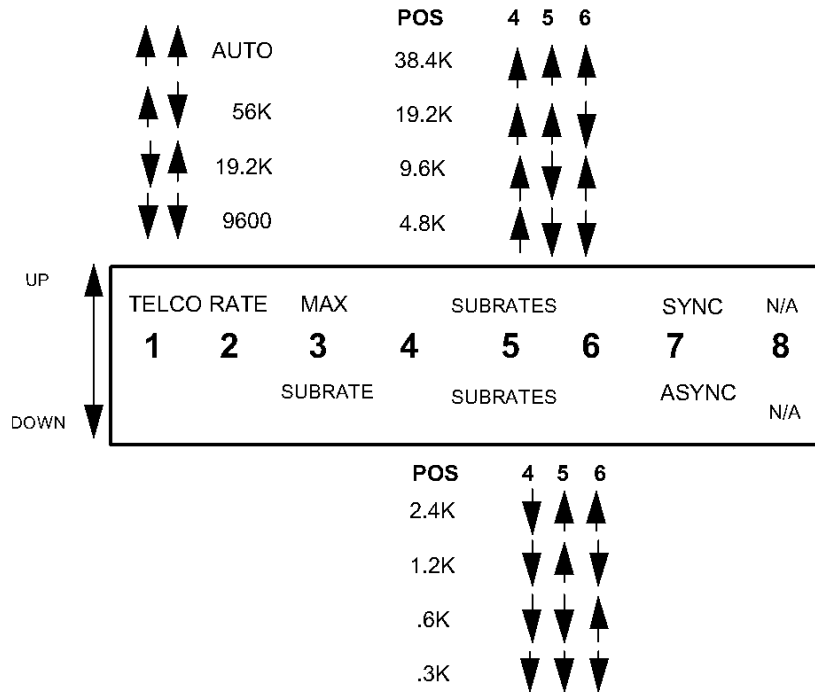
Line rates of 56K, 19.2K or 9.6K can be selected using dip switch S1 at the rear panel of the unit. There is an auto speed setting where the VRL-1 adapts to the line speed automatically. The INS led is used as the speed indicator. Green=56K, Orange=19.2K, Red=9.6K. The INS led flashes until the correct speed is found and then is on steady at the proper color indicating a successful line connection and speed setting.

### DIP SWITCH SETTINGS

DIP switch (S1) is located on the rear of the unit. DIP switch (S2) is located *inside* the unit.

S1.....Rear of unit

## SWITCH 1



S2.....INSIDE UNIT

S2-1      On sets unit to master clock  
           Off sets unit to slave (DDS) clock

S2-2 TO S2-5 NOT USED

S2-6      On sets async data length to 8 bits  
           Off sets async data length to 9 bits

S2-7      On disables user test modes  
           Off enables user test modes

S2-8      On forces RTS on  
           Off RTS follows terminal

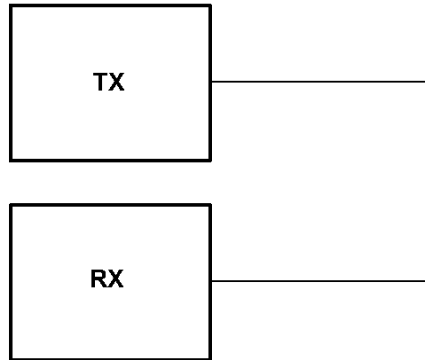
## TESTING AND DIAGNOSTICS

Trouble shooting requires the use of the testing and diagnostic features of the VRL-1, and an understanding of the front panel LEDs. The following describes the LEDs and the front panel push button switch.

- INS-** When on steady indicates correct ( In Service) pattern from the TELCO at the proper speed. Green=56K, Orange=19.2K, Red=9.6K  
Flashing when there is no receive line, out of service pattern is sent by TELCO, unit is out of frame, in self test or Line Loop Mode
- CD-** When on indicates actual valid data being received  
When off either not In Service or Idle Signal is Received
- RTS-** When on indicates RTS present from the terminal  
When off indicates no RTS
- CTS-** When on indicates that you are in service and have a valid RTS  
When off indicates one of the above conditions does not exist.
- TXD-** Flashes when transmit data is present. (Space turns on LED)
- RXD-** Flashes when receive data is present. (Space received turns on LED).
- ST-** Flashes red while awaiting confirmation of correct self test. Flashes green when unit passes self test.
- DL-** When flashing indicates bi-directional digital loop selected. When on steady indicates telco central office has commanded DSU loop.
- LL-** When flashing Line Loop has been selected. When on steady indicates telco has commanded a CSU loop.
- RT-** When on steady green indicates other end sending remote test. Flashes red while **local end** is awaiting valid response from remote end, flashes green when valid response is received.
- Select-** Push button switch that selects test mode.

## TESTING

The test modes are selected by the front panel push button. Each time the button is pushed the test mode steps one position to the right.



### Self Test

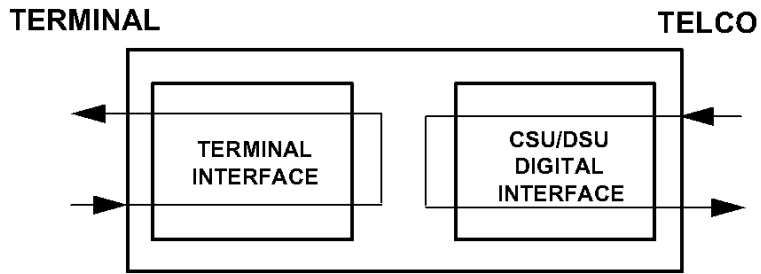
Push the select button once. The self test LED will flash red and internally the transmitter is connected to the receiver as above. An internal test pattern generator run a complete diagnostic on the unit. In about 5 seconds the ST LED should change from flashing RED to flashing GREEN. To return to the normal mode push the front panel push button until all of the right four LEDs are out.

### Line Loop

Push the select button until the Line Loop LED flashes. The unit internally is connected as above. The user can now use a tester plugged into the TERMINAL connector to run tests. Functionally this is the same as the self test except that the internal pattern generator is not used.

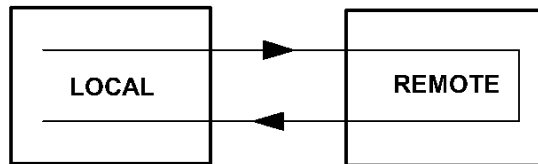
### Digital Loop

Push the test button until the DL LED flashes. Internally the unit is configured as below. This test allows the user to run a complete "round trip" test as shown below.



### Remote Test

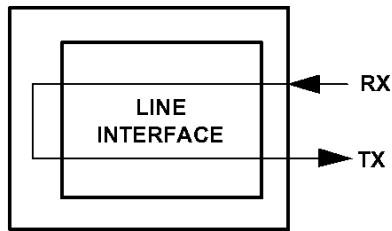
The Remote Test can be performed only between two BAT Electronics units. Push the select button until the RT light flashes. It will flash red until it detects an "OK" pattern from the remote unit. The RT light will then flash green. The remote unit is in a remote test condition and a complete "round trip" test is being performed by the internal pattern generator. To get out of this mode push the select button until none of the right side LEDs are on or flashing



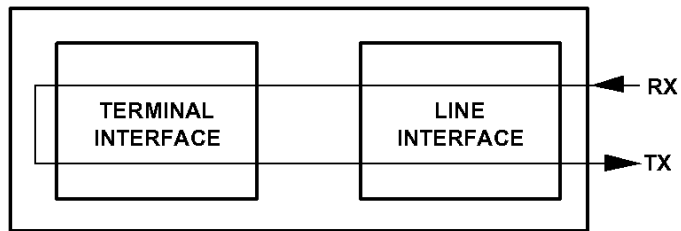
## TELCO TESTING

The telco can perform two types of testing from the central office. They are called DSU loop and CSU loop. The DL light flashes when the DSU loop test is being performed. The LL light is on steady when a CSU loop is being performed by the central office. The loop configurations are shown in the diagrams below. They can be used to isolate problems.

CSU Loop



DSU Loop





## CONNECTOR PIN OUTS

Line Interface

Pin Number		Description
J1-1 J1-2 J1-7 J1-8		TRANSMIT TRANSMIT RECEIVE RECEIVE

# BAT ELECTRONICS, INC.

## LIMITED WARRANTY

BAT ELECTRONICS, Inc. ("BAT") warrants this product against defects in material or workmanship under normal operating conditions for a period of 5 (FIVE) years from the date of purchase. This warranty covers the product during the warranty period when in the possession of the original consumer purchaser only. In the event service is required the product must be delivered within the warranty period (prior authorization is required), transportation prepaid to BAT ELECTRONICS, Inc. together with evidence of date and place of original owner's purchase. You will be responsible for removal and installation of the product.

**LIMITATION OF WARRANTY:** Failures attributable to improper use, storage or maintenance of the product are not covered by this warranty. This warranty shall not apply to manuals or accessories.

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