XVME-904
SERIAL COMMUNICATIONS
ADAPTER MODULE

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XVME-904

1. INTRODUCTION

The XVME-904 Serial Communications Adapter (SCA) module converts the TTL signals provided on the P2 connector of the XVME-420 and XVME-428/3 Serial Communications Modules to standard RS-232C or RS-422A electrical signals. The SCA is user-configurable for either RS-232C or RS-422A operation. Its RS-232C or RS-422A signals are accessible to the user through four DB-25 connectors on the front panel.

The SCA module is a card which fits in a standard VMEbus double-high chassis. However, it does not connect to backplane connectors P1 and P2. Instead, a cable (provided with the kit) connects the P2 connector on either the XVME-420 or XVME-428/3 to the back of the XVME-904.

2. COMPONENTS

The XVME-904 kit consists of the following components:

- XVME-904 board, with all four channels configured for RS-232 operation.
- Four sets of IC chips (8 chips total), required to convert any or all of the four channels to RS-422A operation. Each IC set consists of:

  3487 and 26LS32

  Configuring a channel for RS-422A operation involves removing two ICs (which configure the channel for RS-232C operation) and installing the two ICs in the RS-422A set.
- One cable which connects P2 on the XVME-420 or XVME-428/3 to the back of the SCA (see Figure 1).
- One connector and four crimps for building a power cable.

3. PREREQUISITES

The SCA module can only be used with the following XYCOM XVME modules:

- XVME-420 -- Intelligent Serial Controller Module (4 channel)
- XVME-428/3 -- 8 Channel Intelligent Serial Controller Module with TTL Interface

Since the SCA module provides level conversions for only 4 channels, two XVME-904s are required to convert all eight the channels on the XVME-428/3.

Power Cable

To isolate the VMEbus from any devices connected to the SCA, the SCA does not draw its power from the VMEbus backplane. Instead, the user must supply a power cable connecting the SCA to a power source of the user's choice. This cable is not supplied with the XVME-904. However, the connector housing and crimps are included to facilitate construction of the cable.

For RS-232C operation, the power cable must supply +12V, -12V, and +5V. For RS-422A operation, the power cable need only supply +5V.

The location of the power connector is shown in Figure 2. The silkscreen clearly shows the power signal corresponding to each pin.

4. CONFIGURATION

Before the module is installed, the user must configure the SCA as follows:

1. Specifying with what module the SCA will be used. The choices, which are determined by jumper setting, are the following:

   - XVME-420 module
   - XVME-428/3 channels 0-3
   - XVME-428/3 channels 4-7

2. Configure each channel individually for either RS-232C or RS-422A operation. The XVME-904 is shipped with all four channels configured for RS-232C operation. To configure a channel for RS-422A operation, two IC's must be removed and two other ICs (provided in the kit) installed.

3. Configure each channel individually to function either as DTE or DCE. The XVME-904 is shipped with all four channels configured as DTE. To configure a channel for DCE, a DIP jumper network must be removed from one socket and installed in another socket.

These three steps are described in greater detail below.

Specifying the Module Used With the SCA

A single three-position jumper determines with what module the SCA can be used. This jumper is clearly marked on the silkscreen and shown in Figure 1.

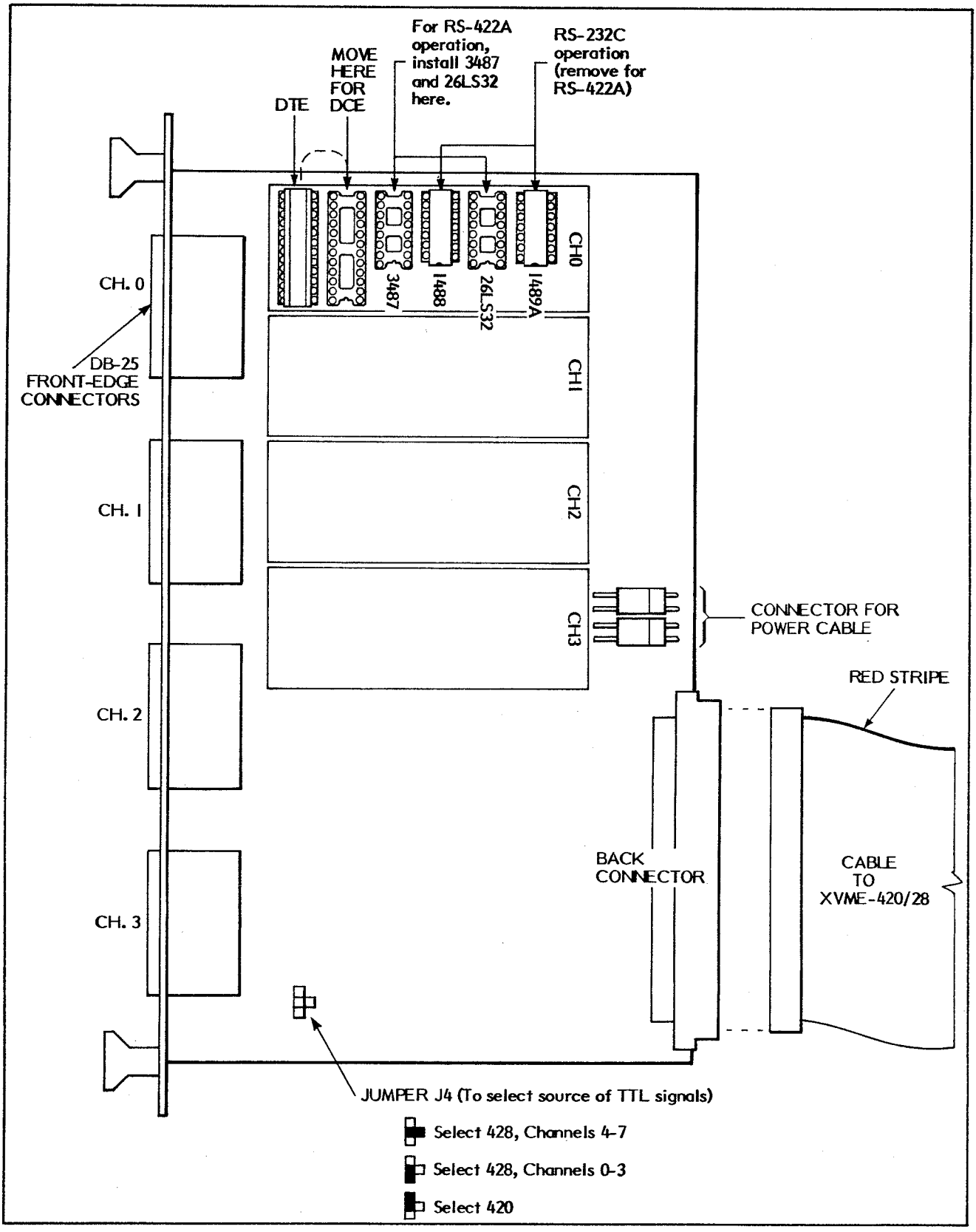

Figure 1. XVME-904 Major Components

RS-232C or RS-422A Operation

The SCA is shipped with each channel configured for RS-232A operation. What establishes the operation as RS-232C are two ICs (1488 and 1489A) per channel, which come installed when the SCA is shipped. The locations of the relevent ICs is clearly marked on the silkscreen and shown in Figure 1. Note that each channel is configured separately, with its own set of chips. A clearly defined area of the SCA board is allotted to each channel.

To change the configuration of a particular channel to RS-422A operation, the user must first locate the area of the board allotted to that channel. He must then relocate the chips within that area as follows:

1. Remove the two chips responsible for RS-232C operation --

   Remove the 1488 chip from the socket labeled 1488
   Remove the 1489A chip from the socket labeled 1489A

2. Install the following two ICs:

   3487, in the socket labeled 3487
   26LS32, in the socket labeled 26LS32

DTE or DCE

Each of the four channels on the XVME-904 can be individually configured to function either as DTE or DCE. The choice for each channel is determined by four chips (which are actually DIP jumper networks), one chip per channel. The XVME-904 is shipped with all four channels configured for DTE. The areas of the board corresponding to each channel, as well as locations of the relevent chips, are clearly marked on the silkscreen and shown in Figure 1.

To change the configuration of a particular channel to DCE, the user must do the following:

- Remove the DIP jumper chip from the socket labeled DTE and install it in the adjacent socket labeled DCE.

5. INSTALLATION

After the XVME-904 is configured, it can be installed in a double-height VME rack, or panel-mounted with handles removed and DB-25 connectors exposed through the panel.

6. CABLE CONNECTION

The XVME-420/428 must be connected to the SCA with the ribbon cable provided in the kit. This cable carries signals straight through from P2 on the XVME-420 or XVME-428/3 to the connector on the back of the SCA. The cable has a single connector at one end and two smaller connectors at the other. All three connectors are keyed, so they can only be installed one way. To install this ribbon cable, do the following:

1. Connect the end with the single connector to P2 of the XVME-420 or XVME-428/3.

2. The other end of the cable has two connectors. Connect the top connector (with red stripe) to the port on the back of the SCA (see Figure 1).

   If the SCA is used on the XVME-420, the bottom of the two connectors on the cable is left free. If the SCA is used with an XVME-428, the bottom connector can be connected to a second SCA module.

NOTE

The eight channels on the XVME-428 are designated as channels 0-7. The channels on the SCA are designated as channels 0-3. The correspondence between the XVME-428 and SCA channels is:

XVME-428 Channel	SCA Channel	
0	0	
1	1	
2	2	
3	3	
4	0	Requires
5	1	a second
6	2	XVME-904
7	3	module

Likewise, the XVME-420 channels are designated as channels 1-4. The correspondence between XVME-420 and XVME-904 channels is:

XVME-420 Channel	XVME-904 Channel
1	0
2	1
3	2
4	3

Finally, you can connect cables to any of the four DB-25 connectors on the front panel. This will establish the serial link between the SCA and any serial device with which the XVME-420 or XVME-428/3 is communicating.

When attaching cables to the four front panel connectors on the RS-232 or RS-422, the following male screw lock assembly is recommended:

TRW CINCH D20419 (or equivalent)

Spacing problems may occur with other assemblies.

7. OPTIONS

Table 1 summarizes the optional components which can be added to the XVME-904, and also lists the locations of these components.

Table 1. Optional Components

	RS-232 CH0	CH1	CH2	CH3
Slew Rate Capacitors	U20	U22	U24	U26
Threshhold Resistors	R1-R3	R4-R6	R7-R9	R10-R12
Noise Filter Capacitors	C4,C5, C12	C6,C7, C13	C8,C9, C14	C10,C11, C15
	RS-422			
Line Termination Resistors	R14-R16	R17-R19	R20-R22	R23-R25

NOTE

All optional resistors are spaced for 1/4 watt resistors. All optional capacitors have .300" lead spacings and should be rated at 50 volts or greater.

Slew Rate Capacitors (RS-232 Operation)

Each channel has a pad to add capacitors that limit the slew rates on the TD, RTS, and DTR signals. These pads are designated as U20, U22, U24, and U26 on the silkscreen. The graph shown in Figure 2 helps select the appropriate value of the slew rate capacitor. As shown in the graph, a 330pF capacitor would be the typical value used.

The PC layout for the slew rate capacitors U20-U26 was designed to accomodate a Sprague series 929C, 8-pin DIP capacitor network (or equivalent). However, a variety of other components can be substituted for this part. Four Sprague series 923C, 2-pin DIP capacitors (or equivalent) can be used, or any capacitors with a .300" lead spacing.

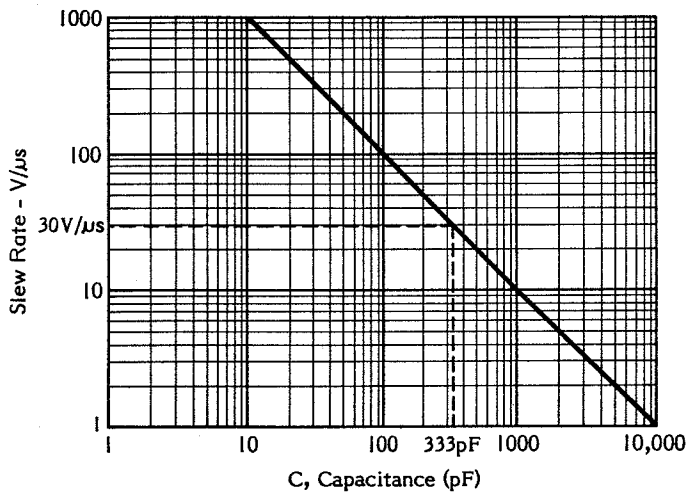

Figure 2. Slew Rate vs. Capacitance

Threshhold Resistors (RS-232)

Pads are provided to add threshhold resistors to each of the RS-232 line receivers. These pads are designated as R1-R12 on the silkscreen. The 1489A receiver has a typical negative threshhold voltage of 1.1 volts and a typical positive threshhold voltage of 1.7 volts for .6 volts of hysteresis (typ.). The threshhold voltages which result from different resistor values are given by the following formula:

$$V_{TH} = 1.4 + \frac{50{,}000}{R}$$ middle of band, band .6V wide

The negative threshhold voltage is .3V less than the middle of the band; the positive threshhold voltage is .3V greater.

Noise Filters (RS-232)

Pads are provided to allow noise filters on each of the RS-232 line receivers. These pads are designated as C4-C15. Figure 3 shows typical noise-pulse rejection for capacitors of various sizes.

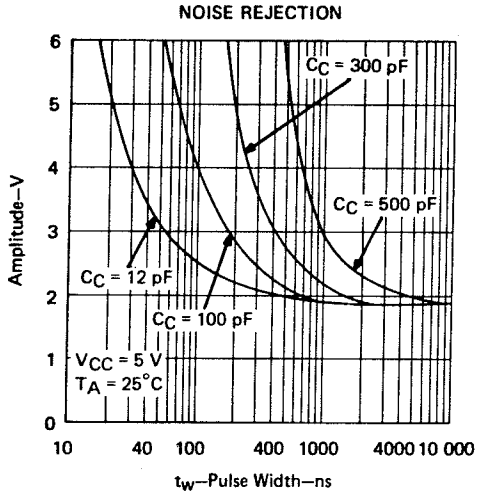

Figure 3. Turn-On Threshhold vs. Capacitance

Line Termination Resistors (RS-422)

Each channel has pads to provide line termination resistors on the RXD, CTS, and DSR signals. These locations are designated as R14-R25. If line termination is used, the resistance value should be selected to match the characteristic impedance of the data cable.

8. PINOUTS ON THE FRONT-EDGE CONNECTORS

The pinouts on the four DB-25 front-edge connectors are listed in Tables 2 and 3.

Table 2. RS-232 Pinouts

Signal	Direction	Pin No.	
		DTE	DCE
TD	Output	02	03
RD	Input	03	02
RTS	Output	04	05
CTS	Input	05	04
DSR	Input	06	20
GND	--	07	07
DTR	Output	20	06
other pins not used			

Table 3. RS-422 Pinouts

Signal	Direction	Pin No.	
		DTE	DCE
SD+	Output	02	03
RD+	Input	03	02
RS+	Output	04	05
CS+	Input	05	04
DM+	Input	06	20
GND	--	07	07
TR+	Output	20	06
SD-	Output	15	16
RD-	Input	16	15
RS-	Output	17	18
CS-	Input	18	17
DM-	Input	19	08
TR-	Output	08	19

The pinouts on the four DB-25 connectors are consistent with the XVME-930 cable. This cable, which has four DB-25 connectors on one end and a 50-pin header on the other, is available separately from XYCOM.

9. SPECIFICATIONS

Environmental Specifications

Temperature	
Operating	0 to 65°C (32 to 149°F)
Non-operating	-40 to 85°C (-40 to 158°F)
Humidity	
Operating	5 to 95% RH, non-condensing
Shock	
Operating	30g peak acceleration, 11ms. duration
Non-operating	50g peak acceleration, 11ms. duration
Vibration	
Operating	5 to 2000 Hz, .015 in. peak to peak, 2.5g max.
Non-operating	5 to 2000 Hz, .030 in. peak to peak, 5.0g max.
Altitude	
Operation	Sea level to 10,000 ft. (3048 m)
Non-operating	Sea level to 50,000 ft. (15240 m)

Current Requirements

All channels configured for RS-232:

+5 volts	
Current	Typical = 614mA Maximum = 815mA
+12 volts	
Current	Typical = 78.7mA Maximum = 98.8mA

All channels configured for RS-422:

+5 volts	
Current	Typical = 1A Maximum = 1.24A

±12 volts not required