RJ45 Interconnection Cables for Sport Replay Controllers

For maximum durability of RJ45 cables, BUFTEK uses and recommends flat, stranded conductor, cable and RJ45 8x8 (8-pin) connectors designed specifically for this type of cable. This is the basic type of cable used for telephone handsets, and is designed to reliably withstand extreme physical and environmental conditions. Cables made with solid conductor wire and/or connectors designed for solid conductor wire (often used for CAT5 and CAT6 data cabling) tend to be intolerant to the constant flexing that control panels tend to receive. In short, solid cable is unreliable and not recommended - use stranded cable and the correct RJ45 connectors.

Most interconnection of BUFTEK controllers uses 1-8 to 8-1 conductor order, meaning the connectors are both crimped onto the flat wire on the same surface, resulting in a reversal of conductor order from one end to the other. This is standard for telephone applications, but not for data, which tends to be pin-for-pin. This conductor reversal, should be confused with a CAT5 "crossover" cable, which crosses over different conductor pairs and will not work in BUFTEK applications. However, some BUFTEK cables use pin-for-pin conductor order, and some cables must have certain pins disconnected to avoid the interconnection of power supplies or data signals.

All BUFTEK controllers and SD Sport Replay Systems have the following pinout on the RJ45 AUX connector: (RJ45 connector pins count from the left looking into a female connector with pins on top, or looking at a cable connector's conductors with that end of the connector pointed up)
RJ45-8: Controller RS-422 TX- ("9-PIN" DE09 connector Pin-8)
RJ45-7: Controller RS-422 TX+ ("9-PIN" DE09 connector Pin-3)
RJ45-2: Controller RS-422 RX- ("9-PIN" DE09 connector Pin-2)
RJ45-1: Controller RS-422 RX+ ("9-PIN" DE09 connector Pin-7)
RJ45-3: Controller RS-422 Ground and Power Supply Negative ("9-PIN" DE09 Pin-4, 6, 1 - shield)
RJ45-6: Power Supply +12VDC (Amperage varies per application)
RJ45-5: Modified RS-485 TX/RX+ (used to communicate with TBar)
RJ45-4: Modified RS-485 TX/RX- (used to communicate with TBar)

Note: These pinouts are on the controller side, when a reversing order cable is used (like in the case of a VTA-2001 to adapt to a 9-pin) the conductor order on the adapter side is reversed.

RJ45 Interconnection Cables for Sport Replay Controllers

Conductor order and removed connections per application:

APPLICATION	LENGTH	CONDUCTOR ORDER	CONNECTED CONDUCTORS
"REGULAR" BUFTEK CABLE (NO LABEL) CONNECTS CONTROLLERS TO ADAPTERS AND RM-HD	15 FEET	REVERSED (1-8 TO 8-1)	ALL CONDUCTORS CONNECTED
SHORT BUFTEK CABLE (NO LABEL) CONNECTS RM-HD PANEL TO NEXT, PANEL TO TBAR	12 INCHES	REVERSED (1-8 TO 8-1)	ALL CONDUCTORS CONNECTED
"T" TO "T" AND TO SPORT REMOTE AUX CH-2 - CH-6 CONNECTS SD SPORT SYSTEMS TOGETHER	24 INCHES ALSO 15 FOOT	PIN-FOR-PIN (1-8 TO 1-8)	ONLY 3-4-5 CONNECTED BOTH ENDS
SPORT "AUX" OR TBAR "AUX-E" TO SPORT-HD PANEL CONNECTOR	15 FEET	REVERSED (1-8 TO 8-1)	3-4-5 ONLY CONTROLLER END (3-5 TO 6-4)

PART NUMBER: CADB9M-M-RSR

CABLE FABRICATION INFORMATION
FOR CONNECTION FROM:
RM-4000 AUX-A RS-422 PORT TO
TCW (HORITA SCT-P SPECIAL) VIDEO TEXT INSERTER

CUT ONE CONNECTOR OFF THE PREFAB CADB9M-M
AND TERMINATE DE9M TO OTHER END
(SHIELD WIRE IS CONNECTED TO DE9M SHELL)

RS-232 9-PIN MALE 'D' FOR TCW	CADB9M-M 9-PIN MALE 'D' (PREFAB WIRE)	RS-232 9-PIN FEMALE 'D' (RM-4000 CTRL)	PREFAB WIRE COLOR
—	1	N/U	BROWN
2	2	RM RX-	RED
—	3	RM TX+	ORANGE
5	4	RM GND	YELLOW
—	5	N/U	GREEN
—	6	N/U	BLUE
5	7	RM RX+	VIOLET
3	8	RM TX-	GRAY
—	9	N/U	BLACK

CONNECT

CABLE FABRICATION INFORMATION FOR:
"CHEATER" CABLE TO CONNECT
VTA-2001 OR BNA-1001 (SET AS CONTROLLER PORT)
RS-422 PORTS TO "9-PIN" RS-232 COMPUTER PORTS.

**SINCE BUF CONTROLLERS USE RS-485/RS-422 I/O CHIPS, THEY
ARE ABLE TO SAFELY RECEIVE RS-232 VOLTAGE LEVELS DIRECTLY.
AND BECAUSE MOST PC RS-232 PORTS HAVE AN INPUT THRESHOLD
OF ABOUT 2 - 2.5V (TTL/CMOS COMPATIBLE LEVELS) RATHER THAN
THE SPECIFIED RS-232 ZERO VOLT THRESHOLD, THEY CAN
USUALLY RECEIVE DIRECTLY RS-422 OUTPUTS (ROUGHLY 1-4V).
THIS IS NOT GUARANTEED TO WORK, NOR SHOULD BE USED IN
FULL-TIME APPLICATIONS REQUIRING A RELIABLE CONNECTION.
HOWEVER, THIS "CHEATER" METHOD TENDS TO WORK WELL ENOUGH
FOR OCCASIONAL USES LIKE UPLOADING FIRMWARE. THIS "CHEATER"
CABLE DOES NOT CONNECT HARDWARE FLOW CONTROL SIGNALS,
SO FLOW CONTROL SHOULD BE DISABLED (STANDARD WITH BUF UTILITIES).**

VTA-2001/BNA-1001 9-PIN MALE 'D' DE09M (CONNECTS TO ADAPTER DE09F)	PC RS-232 9-PIN FEMALE 'D' DE09F (CONNECTS TO PC DE09M)	SIGNAL
2	3	CONTROLLER RX- (PC TX-)
3	—	CONTROLLER TX+
4	5	GROUND
—	—	N/U
—	—	VTR TX GND
7	—	CONTROLLER RX+
8	2	CONTROLLER TX- (PC RX-)

VTA-2001 Adapter Pin Information

RJ45 connector pins count from left looking into female connector with pins on top.
DE09 (also called DB09) female pin order looking into mating end of connector, holding like a "D":
    upper left is pin 1 counting down to pin 5, then upper right is pin 6 counting down to pin 9.
Power connector used on the VTA-2001: Side with flat outside is (-), side with round outside is (+).
RS-422 below is with respect to controlled device (VTR/server), for controller, reverse TX's and RX's.

RJ45-7 to DE09-2 (VTR RS-422 TX-)
RJ45-8 to DE09-7 (VTR RS-422 TX+)
RJ45-1 to DE09-8 (VTR RS-422 RX-)
RJ45-2 to DE09-3 (VTR RS-422 RX+)
RJ45-6 to DE09-4 (GND) and Power Supply GND
RJ45-3 to Power Supply +12VDC @ 500mA (or 1000mA for some products)
RJ45-4 to Modified RS-485 TX/RX+ (not used)
RJ45-5 to Modified RS-485 TX/RX- (not used)

VTA-2001-RS adapter converts the RS-485 to RS-232 on DE09 CONTROLLER connector.
    Pinout is DCE to plug pin-for-pin to a computer (DTE) DE09 connector.
    Only Ground, TX, and RX are used, no control signals are used. Pins 3-4-5 are connected together.

Connection from the VTA-2001 to BUF control panels are via a telephone style RJ45 cable
which has the conductor order reversed from one end to the other. Pinouts shown here for the RJ45 connector
are for the adapter, reverse the pin order for the control panel side.

CAT5 cables do not reverse order so cannot be used without VTA-2001 modification or external adaptation.

CAT5 "crossover" cables do not change the pin order the same way and will not work.

BNA-1001 Adapter Pin Information

RJ45 connector pins count from left looking into female connector with pins on top.
DE09 (also called DB09) female pin order looking into mating end of connector, holding like a "D":
   upper left is pin 1 counting down to pin 5, then upper right is pin 6 counting down to pin 9.
Power connector used on the BNA-1001: Side with flat outside is (-), side with round outside is (+).

RJ45-7 to   DE09-2 (VTC-4000 COMPUTER PORT RS-422 RX-)*
RJ45-8 to   DE09-7 (VTC-4000 COMPUTER PORT RS-422 RX+)*
RJ45-1 to   DE09-8 (VTC-4000 COMPUTER PORT RS-422 TX-)*
RJ45-2 to   DE09-3 (VTC-4000 COMPUTER PORT RS-422 TX+)*
RJ45-6 to   DE09-4 (GND), Power Supply GND, and (both) XLR-3 pin 1 (GND)
RJ45-3 to   Power Supply +12VDC @ 500mA (or 1000mA for some products)
RJ45-4 to   (both) XLR-3 pin 2 (modified RS-485 BUFNET +)
RJ45-5 to   (both) XLR-3 pin 3 (modified RS-485 BUFNET -)

*TX and RX lines can be reversed by changing (4) internal jumpers

BNA-1001-RS adapter converts the RS-422 to RS-232 on DE09 connector.
   Pinout is DCE to plug pin-for-pin to a computer (DTE) DE09 connector.
   Only Ground, TX, and RX are used, no control signals are used. Pins 3-4-5 are connected together.

Connection from the BNA-1001 to BUF control panels are via a telephone style RJ45 cable
which has the conductor order reversed from one end to the other. Pinouts shown here for the RJ45 connector
are for the adapter, reverse the pin order for the control panel side.

CAT5 cables do not reverse order so cannot be used without VTA-2001 modification or external adaptation.

CAT5 "crossover" cables do not change the pin order the same way and will not work.

CABLE FABRICATION INFORMATION
FOR CONNECTION TO XLR-3 CONNECTORS ON:
VTC-4000'S BNA-1001, RM-4000, IFD-422
USING CAT5 CABLE

XLR-3 CONNECTORS CARRY SIGNAL AFFECTIONATLY CALLED "BUFNET"
WHICH IS A ROBUST AND COMPATIBLE MODIFICATION OF RS-485

RJ45 ON BNA-4000 AND RM-4000R (PANEL)	RJ45 ON VTC-4000 AND RM-4000R (SLIDE)	BNA-1001 AND RM-4000 XLR-3 (BOTH M & F)	RS-485 (MODIFIED) SIGNAL	SUGGESTED CAT5 OR CAT6 CONNECTION
6	3	1	GROUND	3
4	5	2	TX/RX+	5
5	4	3	TX/RX-	4

PART NUMBERS: CADB9M-F-RS AND CADB9F-M-RS

CABLE FABRICATION INFORMATION
FOR CONNECTION FROM:
RS-422 VTR CONTROL PORT TO RS-232 COMPUTER PORT
AND FROM RS-422 VTR PORT TO RS-232 COMPUTER PORT

CUT ONE CONNECTOR OFF THE PREFAB CADB9M-M
AND TERMINATE DE9F TO OTHER END DEPENDING ON RS-422 DIRECTION NEEDED
(SHIELD WIRE IS CONNECTED TO DEB9M SHELL)

CADB9F-M-RS RS-232 9-PIN FEMALE 'D' FOR VTR I/F	CADB9M-F-RS RS-232 9-PIN FEMALE 'D' FOR CTRLR I/F	CADB9M-M 9-PIN MALE 'D' (PREFAB WIRE)	RS-232 9-PIN FEMALE 'D' (VTR CONTROL)	PREFAB WIRE COLOR
—	—	1	SHIELD	BROWN
2	3	2	VTR TX-	RED
5	—	3	VTR RX+	ORANGE
5	5	4	VTR RX GND	YELLOW
—	—	5	N/U	GREEN
—	—	6	VTR TX GND	BLUE
—	5	7	VTR TX+	VIOLET
3	2	8	VTR RX-	GRAY
—	—	9	SHIELD	BLACK

CONNECT   CONNECT

CABLE FABRICATION INFORMATION
FOR CONNECTION FROM:
MAC TO BUFROUTE IFD-422-RS INTERFACE (RS-232)
MAC TO ELO TOUCHSCREEN (RS-232)
MAC TO BUFROUTE IFD-422 INTERFACE (RS-422)
MAC TO IR-422 INFRARED REMOTE (RS-422)

| ONE END	MAC 8-PIN MALE MINI-DIN	OTHER END	RS-232 9-PIN MALE 'D'	RS-422 9-PIN MALE 'D'	SIGNAL NAME
RED	1	BRN	---	---	SHIELD
BRN	2	RED	---	---	N/U
GRN	3	OR	3	2	MAC TX-
YEL	4	YEL	5	4	SIG GROUND
OR	5	GRN	2	8	MAC RX-
BLK	6	BLU	---	7	MAC TX+
PUR	7	PUR	---	---	N/U
BLU	8	BLK	---	3	MAC RX+
SHIELD			---	---	SHIELD
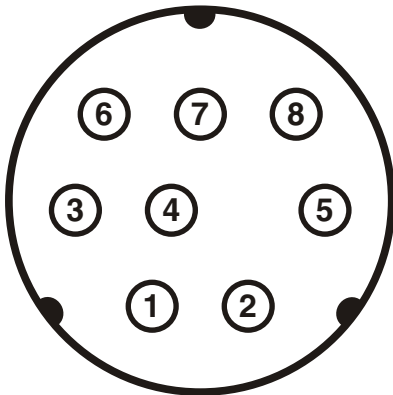
**PIN ASSIGNMENTS OF
MAC MODEM & PRINTER PORTS
(LOOKING INTO END OF MALE
8-PIN MINI-DIN CABLE CONNECTOR)**

BUf TECHNOLOGY

858-451-1350

BUF TECHNOLOGY	
PROJECT: MAC CABLE FAB INFO	
DATE: 990831	
BY: BRUCE BREDON	
12335 World Trade Drive, #11 San Diego, CA 92128	

IFD-422

ROUTER

P1

J2

DE9M

DE9F

D1
1N4148

D2
1N4148

R1 10K

LAPTOP

J3

DE9F
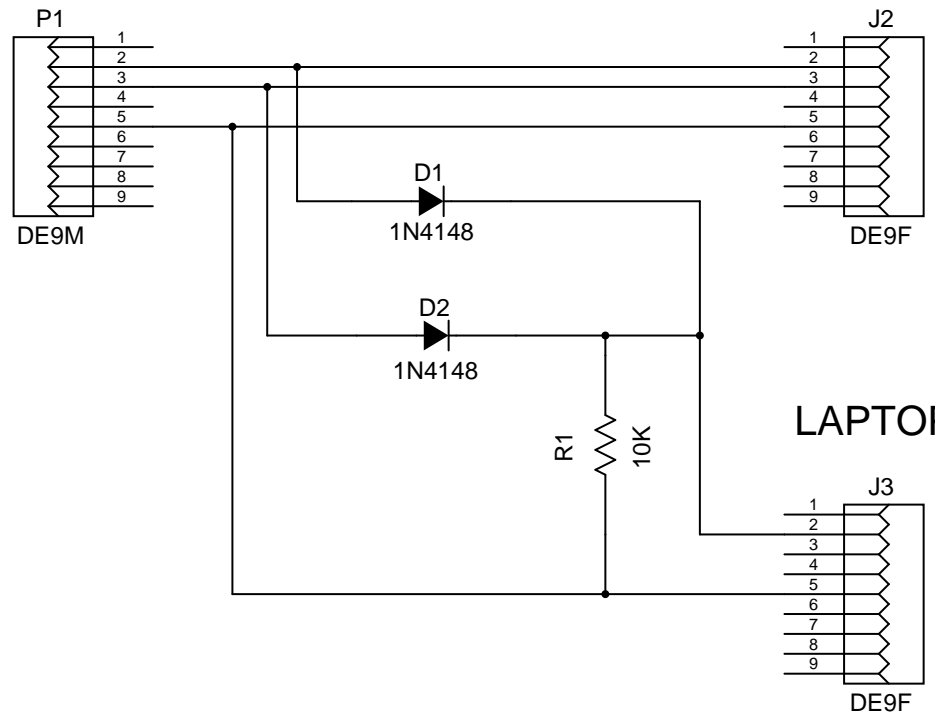
RS-232 MONITOR CABLE

BUF
TECHNOLOGY

858-451-1350

BUF TECHNOLOGY

PROJECT: RS-232 MONITOR CABLE

DATE: 060629

BY: BRUCE BREDON

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