



DCB, Inc.
2949 CR 1000 E
Dewey, Illinois
61840

217.897.6600 Tel
 800.432.2638 Toll Free
 217.897.1331 Fax
 www.dcbnet.com

8 DBRA (Data Bridge Card) Startup and Configuration Guide
Ver 2, April, 2011

There are 2 version of the 8DBRA card, one with 2 RJ45s and 2 HD44 connectors that require 2 fanout cables, each with one DE9 and 2 DB25s. The other card has 8 RJ45 connectors. The all RJ45 version is preferred because the connectors are all the same. The card supports transmit data, receive data and ground on each port. RS232 control leads are not supported.

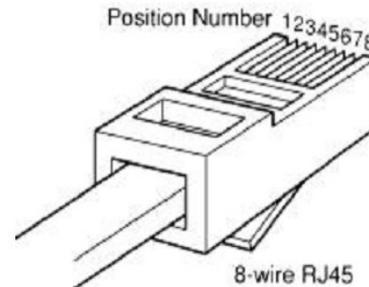


The 8DBRA card with the 8 RJ45 connectors provides easier, cleaner looking connections.



Pin outs for the RJ45 connectors:

Pin Number	Signal	Source
1	Signal Ground	Common
3	Received Data	DCE (8DBRA)
5	Transmitted Data	DTE
7	Signal Ground	Common



The 8 DBRA card supports asynchronous ports at any speed up to 19,200 bps. The speed setting in the 8DBRA card setup screen is for reference only.

The 8DBRA card is compatible with other 8DBRA cards and any synchronous RS232 56Kbps or 64 Kbps card or 56K or 64K OCUDP from Loop or other manufacturers (tested!). The 8DBRA card uses oversampling. See Page 16 for a description of the oversampling technique. Terminal devices attached to non-8DBRA cards must run at the same speed as the devices attached to the 8DBRA cards.

The 8 ports of the 8DBRA can be mapped into 3 or 4 Virtual Ports (VP). If the 8DBRA card is configured for "NO Backup" or "1+1 Port Backup", all 4 of the Virtual Ports are available. Backing up the entire card in the same or a different chassis limits the card to 3 virtual ports. Data is carried to the backup card, whether in the same chassis or to a remote site, via one of the Virtual Ports (VP4).



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The 8 DBRA card has 32 time slots for each Virtual Port, for a total of 128 time slots. Any one of the RS232 ports can be mapped to maximum of 20 downstream endpoints (DS-0s) on a multidrop circuit.

Mapping is a 2 step process. The first step is to map the physical RS232 ports to virtual ports, then map the virtual ports to one or more DS-0s. The card mapping is a sub menu for the card slot. The Virtual Port mapping is done at the AM3440 system time slot interchange (TSI) mapping level.

The 8 DBRA card protection mode allows port/card protection on the same card, on a different card in the same chassis, or on a different (remote) chassis.

The 8DBRA card can be used at a central host site, a midpoint remote drop location, or endpoint remote drop location.

At a host site, backup may be:

- To the backup ports (ports are paired 1 and 5, 2 and 6, 3 and 7, 4 and 8).
- To a second card in the same chassis. Card slots are paired 1&2, 3&4, 5&6, etc.
- To a second card in a different chassis at another location

At a remote drop site (downstream location), backup may be:

- To the backup ports (ports are paired 1 and 5, 2 and 6, 3 and 7, 4 and 8).
- To a second backup card in the same chassis

All 8 ports of the 8DBRA card can be mapped to different locations unless the card is set for 1+1 port backup. In 1+1 port backup, 1&5, 2&6, 3&7, 4&8 are paired, limiting the ports to 4 pairs.

The 8DBRA card can be used as a host end digital bridge device or an 8 port asynchronous data card. The 8DBRA card is most useful, and is unique for its function as a host digital bridge device, where data from a host computer attached to one of the RS232 host ports is broadcast out to as many as 20 endpoints. At the card level, RS232 ports are mapped to Virtual Ports (VPs). At the Time Slot Interchange (TSI) map level, the Virtual Port (VP) time slots are mapped to DS-0s on T1/E1/FOM circuits. Therefore mapping is a 2 step process.

If a card is used as an 8 port asynchronous port card only (not for its bridging capability), each port is mapped to a different time slot on a Virtual Port. As an 8 port asynchronous card in a point to point application, only 8 of the 128 time slots are used. Only one Virtual Port (VP) needs to be used.



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DATA COMM FOR BUSINESS

Step One, setting up the card mode for 56 Kbps or 64 Kbps operation:

The 8DBRA card can be set to over sample at either 56 Kbps or 64 Kbps. All 8 ports share the same sampling rate of either 56 Kbps or 64 Kbps. After the card is changed from one rate to the other, it is necessary to reset the card.

When the 8DBRA card is reset, all card mapping is set to default (no mapping). The card reset takes about 50 seconds to complete. Be patient.

Below are the screens showing the "M → Mode Setup" selection, the 56/64K selection.

```
SLOT 5 8DBRA P1          === Port Menu ===          13:51:15 04/03/2011
Version      : SW V1.02.01 03/31/2011
              HW Ver.B  FPGA Ver.B
Backup Mode: NO      (64K)

[DISPLAY]
T -> Port Map Configuration
C -> RS232 Configuration

[SETUP]
M -> Mode Setup
B -> Backup Setup
K -> Port Map Setup
S -> RS232 Config Setup
G -> Upgrade Firmware
```

```
SLOT 5 8DBRA P1          === Mode Setup ===          13:51:30 04/03/2011
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Mode: 64K

Note: Change Mode will reset card
```

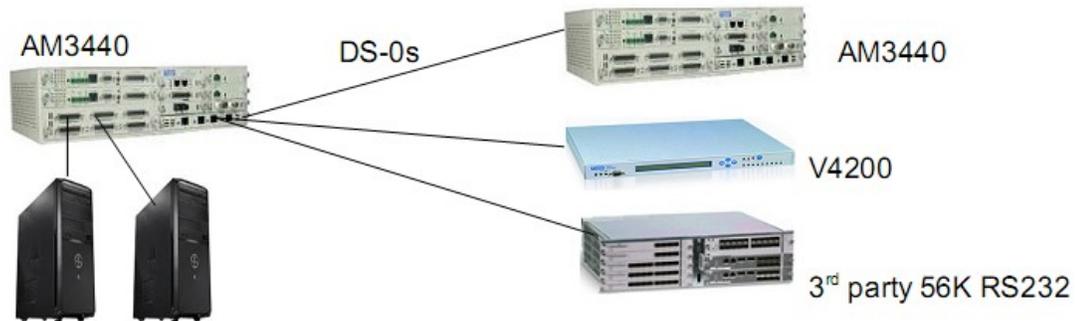
Card reset clears all 8DBRA card mapping (8DBRA ports and time slots to Virtual Ports). The reset process takes a bit less than one minute.



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Simple Application of the 8DBRA, single host location only:



SCADA Primary & backup hosts

First, note that the chassis has 8DBRA cards in slots 3 and 4.

```

LOOP AM3440-C          === Information Summary ===          11:54:00
12/01/2010

Slot Card/Interface    Serial    Software Version    Registered Card
=====
A   FOM                N/A      V3.02.03 07/30/2010  FOM
B
C
D
=====
1   Quad T1            002095   V3.02.03 07/30/2010  Quad T1
2   E&M                001937   V4.02.02 07/30/2010  E&M
3   8DBRA             N/A     V1.01.01 05/05/2010 8DBRA
4   8DBRA             N/A     V1.01.01 05/05/2010 8DBRA
5   FXS                002097   V3.01.03 07/30/2010  FXS
  
```

Next, select a card. From the main menu, "U" and "3" for slot 3. No backup mode selected yet.

```

SLOT 3 8DBRA P1          === Port Menu ===          11:57:44 12/01/2010

Version      : SW V1.01.01 05/05/2010
              HW Ver.B  FPGA Ver.A

Backup Mode: NO

[DISPLAY]          [SETUP]
T -> Port Map Configuration    B -> Backup Setup
C -> RS232 Configuration      K -> Port Map Setup
                              S -> RS232 Config Setup
                              L -> Loopback Test
  
```



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G -> Upgrade Firmware

Select "B -> Backup Setup" Select "1+1 Port Backup". This selection pairs ports 1 & 5, 2 & 6, 3 & 7, 4 & 8. They are digitally bridged together.

```
SLOT 3 8DBRA P1          === Backup Setup ===          12:01:19 12/01/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Backup Type : 1+1 Port Backup

Warning!! Change Backup Type will clear map.
```

Next you can select "S -> RS232 Config Setup". This is reference only. The card supports any async speed up to 19200 bps regardless of what is on this screen.

```
SLOT 3 8DBRA P1          === RS232 Setup ===          12:04:25 12/01/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

RATE      : 9.6KBps

Interface : 8RJ
```

Back out to the Port Menu and select "K -> Port Map Setup" See the port map setup on the next page. You will need to map only ports 1, 2, 3 and 4.

In the example below, RS232 (the physical port) is mapped to time slots 1, 2 and 3 of Virtual Port 1. This will allow the data from RS232 port 1 to be mapped to 3 different DS-0s. Use the arrow keys to move down the screen from Virtual Port, to TS start, to Total TS, RS232 Port and Command. When you get down to "Command : Set", use the "Enter" key to accept the selection. Using the arrow key does not accept the mapping.



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```

SLOT 3 8DBRA P3          === Port Map Setup ===          13:31:19 12/01/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

[Setup]
Virtual Port: P1
TS start      : 01
Total TS      : 01
RS232 Port    : 1
Command       : Set

[Display]
Port TS: 1          9          17          25          32
VP1 MAP: 111iiiiii iiiiiiiii iiiiiiiii iiiiiiiii
VP2 MAP: iiiiiiiii iiiiiiiii iiiiiiiii iiiiiiiii
VP3 MAP: iiiiiiiii iiiiiiiii iiiiiiiii iiiiiiiii
VP4 MAP: iiiiiiiii iiiiiiiii iiiiiiiii iiiiiiiii

Note: i=idle, 1~8=RS232 port number
  
```

After the RS232 ports are mapped to the Virtual Ports, back out to the Main Controller Menu, then select "S -> System Setup" and "C -> TSI Map Setup". Map the Virtual Ports to the appropriate DS-0s.

In the example below, Virtual Port 1 of the 8DBRA in slot 3 is mapped to DS-0 number 1 on 3 different T1 circuits on the Slot 1 Quad T1 card. PO is the port, TS the time slot, SL is the slot number. Immediately below is a snapshot of the key data from the TSI mapping page.

```

8DBRA   Quad T1
=====
PO/TS D SL/PO TS
  1 1  d  1  1  1
  1 2  d  1  2  1
  1 3  d  1  3  1
  
```

When mapping the System Time Slot Interchange (TSI), you are always mapping 8DBRA virtual ports. The first column above labeled "PO" under 8DBRA is the Virtual Port number. RS232 ports were previously mapped to the virtual ports using the card slot sub menu. See the top of this page.



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The full DS-0 TSI mapping page is shown below:

```

LOOP AM3440-C          === System Setup (MAP) ===          13:47:09 12/01/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS
MAP NO: MAP_1
Target                8BDRA                                Source
PO/TS D SL/PO TS    PO/TS D SL/PO TS    PO/TS D SL/PO TS    PO/TS D SL/PO TS
Slot : 3            =====
Port :              1 1 d 1 1 1          17 d
T.S. : 01           1 2 d 1 2 1          18 d
                   1 3 d 1 3 1          19 d
                   4 d                    20 d
T.S.# : 1           5 d                    21 d
Clear : No          6 d                    22 d
d/v   : d           7 d                    23 d
                   8 d                    24 d
                   9 d                    25 d
Source              10 d                   26 d
Slot : A            11 d                   27 d
Port :              12 d                   28 d
T.S. : 01           13 d                   29 d
                   14 d                   30 d
Confirm?Yes        15 d                   31 d
                   16 d                   32 d
  
```



Since 1+1 Port Backup was selected, host ports 1 & 5, 2 & 6, 3 & 7, 4 & 8 are bridged. Host data transmitted into either port and is received downstream via the Virtual Port time slots mapped to the T1 DS-0s. Remote terminal responses are received on both of the paired ports.

In summary, follow these steps:

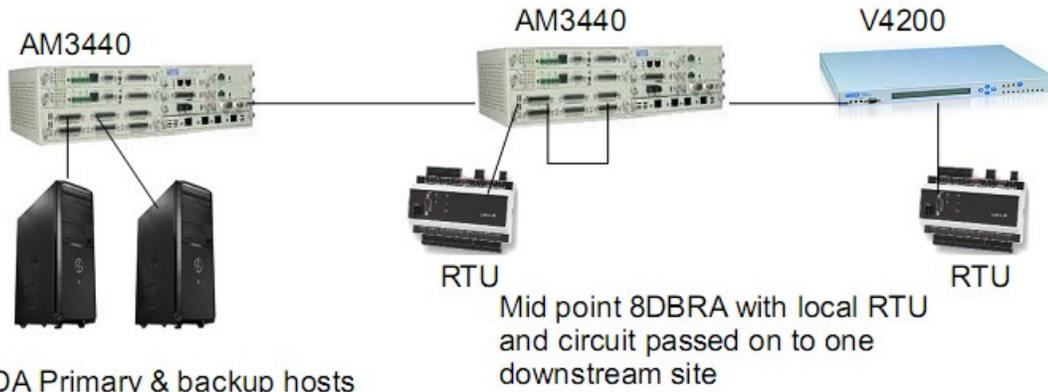
1. Select the backup type.
2. Map RS232 ports to the Virtual Ports through the card slot sub menu.
3. Map the Virtual Ports to the T1/E1/FOM time slots on the System Setup TSI Map Setup.



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Mid point 8DBRA with local RTU and data passed downstream:



The host is presumed to be mapped per the first example on pages 2 through 6. The midpoint AM3440 will have an 8DBRA card and a Quad T1 card. We want to do the following:

Set the 8DBRA card for 1+1 Port Backup

On the 8DBRA Port Map Setup, map RS232 port 1 to the upstream host T1 to the AM3440.

On the 8DBRA Port Map Setup, map RS232 port 2 to the downstream T1 to the V4200

```
SLOT 3 8DBRA P1          === Backup Setup ===          14:13:33 12/01/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS
```

```
Backup Type : 1+1 Port Backup
```

```
SLOT 3 8DBRA P1          === Port Map Setup ===        14:14:01 12/01/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS
```

```
[Setup]
Virtual Port: P1
TS start      : 01
Total TS      : 01
RS232 Port    : 1
Command       : Set
```

```
[Display]
Port TS: 1      9      17      25      32
VP1 MAP: 1iiiiiii iiiiiiiiii iiiiiiiiii iiiiiiiiii
VP2 MAP: 2iiiiiii iiiiiiiiii iiiiiiiiii iiiiiiiiii
VP3 MAP: iiiiiiiiii iiiiiiiiii iiiiiiiiii iiiiiiiiii
VP4 MAP: iiiiiiiiii iiiiiiiiii iiiiiiiiii iiiiiiiiii
```

Two different Virtual Ports (VP1 and VP2) are used in the above example. VP1 only could have been used, with RS232 port 1 mapped to VP1, Time Slot 1, and RS232 port 2 mapped to VP1, Time Slot 2.



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The screen below shows that the 8DBRA RS232 Port 1 is mapped to Virtual Port 1, and VP 1 is mapped to the Slot 1 Port 1 DS-0 number 1, which is a Quad T1 card. This time slot goes upstream toward the host.

```

LOOP AM3440-C      === System Configuration (Map) ===    14:18:05 12/01/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS
Map Number:MAP_1

Slot Number: 3    8BDRA      PO/TS D SL/PO TS      PO/TS D SL/PO TS
Port Number:VP1  =====
                   1 1 d 1 1 1          17 d
                   2 d                    18 d
                   3 d                    19 d
  
```

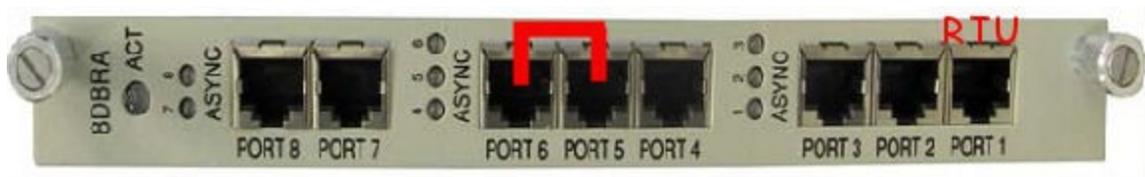
The screen below shows that the 8DBRA RS232 Port 2 is mapped to Virtual Port 2, and VP 2 is mapped to the Slot 1 Port 2 DS-0 number 1, which is a Quad T1 card. This time slot goes downstream toward the V4200.

```

LOOP AM3440-C      === System Configuration (Map) ===    14:18:05 12/01/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS
Map Number:MAP_1

Slot Number: 3    8BDRA      PO/TS D SL/PO TS      PO/TS D SL/PO TS
Port Number:VP2  =====
                   2 1 d 1 2 1          17 d
                   2 d                    18 d
                   3 d                    19 d
  
```

Data from the host comes out RS232 Ports 1 and 5 because of the 1+1 Port Backup. RS232 Port 1 can be connected to a local RTU. To get data downstream, connect RS232 Port 5 to RS232 Port 2 or 6 with a 3-wire RJ45 to RJ45 crossover cable. See the table on page 1 for pinouts. Connect the ground 1 to 1 or 7 to 7. Connect 3 to 5 and 5 to 3 to cross the data leads.

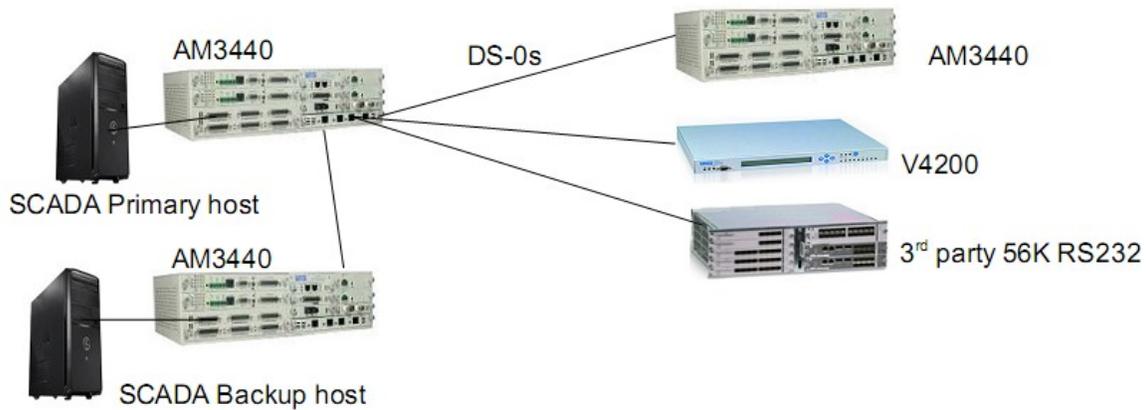




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SCADA Dual Primary and Secondary Backup Host:



First, set the Backup on the Primary Host of a Dual Host system.

```
SLOT 3 8DBRA P1          === Backup Setup ===          16:36:29 12/01/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Backup Type : Dual Host
Site       : Primary
```

Map the RS232 ports to the Virtual Ports. There are 3 Virtual Ports available. VP4 is used to map the card to the Secondary backup site.



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In the example below, RS232 ports 1 and 2 each have 2 time slots mapped. RS232 Port 1 is mapped to VP1, RS232 Port 2 is mapped to VP2. Alternatively, both RS232 ports could be mapped to VP1, where RS232 Port 1 uses VP1, Time Slots 1 and 2, RS232 Port 2 could use VP1, Time Slots 3 and 4 (or any other, but consecutive time slots are easier to track).

```
SLOT 3 8BDRA P1          === Port Map Setup ===          16:38:15 12/01/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS
```

```
[Setup]
Virtual Port: P1
TS start      : 01
Total TS      : 01
RS232 Port    : 1
Command       : Set
```

```
[Display]
Port TS: 1          9          17          25          32
VP1 MAP: 11iiiiiii iiiiiiii iiiiiiii iiiiiiii
VP2 MAP: 22iiiiiii iiiiiiii iiiiiiii iiiiiiii
VP3 MAP: iiiiiiii iiiiiiii iiiiiiii iiiiiiii
```

Note: i=idle, 1~8=RS232 port number

Map the Virtual Ports VP1 and VP2 shown above to the appropriate T1 DS-0s that go out to the remote locations. The map below has VP1 mapped to the Quad T1 Port 1, time slots 1 and 2.

```
LOOP AM3440-C          === System Setup (MAP) ===          16:48:13 12/01/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS
```

```
MAP NO: MAP_1
Target      8BDRA          Source
Target      PO/TS D SL/PO TS PO/TS D SL/PO TS PO/TS D SL/PO TS PO/TS D SL/PO TS
Slot : 3          =====
Port : 1 1 d 1 1 1      17 d
T.S. : 01 1 2 d 1 1 2  18 d
           3 d          19 d
           4 d          20 d
T.S.# : 1         5 d          21 d
Clear : No        6 d          22 d
d/v   : d         7 d          23 d
           8 d          24 d
           9 d          25 d
Source      10 d          26 d
Slot : 1         11 d          27 d
Port : P1        12 d          28 d
T.S. : 01        13 d          29 d
           14 d          30 d
Confirm?Yes  15 d          31 d
           16 d          32 d
```

<< Press ESC to return to Controller Setup menu, then Press D to active >>



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Map the Virtual Port 4 to the T1 that connects to the Secondary Backup site. The example below shows 2 DS-0s mapped over a T1 to the backup site. The 2 DS-0s are necessary because there are 2 Virtual Ports used on the 8DBRA Primary Site card that are also directed to the Secondary backup site. Each DS-0 on VP4 carries a separate asynchronous polling data stream.

```

LOOP AM3440-C          === System Setup (MAP) ===          16:49:13 12/01/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS
MAP NO: MAP_1
Target      8DBRA
PO/TS D SL/PO TS PO/TS D SL/PO TS PO/TS D SL/PO TS PO/TS D SL/PO TS
Slot : 3
Port : VP4  4 1 d 1 3 1    17 d    1 d    17 d
T.S. : 01   4 2 d 1 3 2    18 d    2 d    18 d
           3 d    19 d    3 d    19 d
           4 d    20 d    4 d    20 d
T.S.# : 1   5 d    21 d    5 d    21 d
Clear : No  6 d    22 d    6 d    22 d
d/v   : d   7 d    23 d    7 d    23 d
           8 d    24 d    8 d    24 d
           9 d    25 d    9 d    25 d
Source     10 d   26 d   10 d   26 d
Slot : A   11 d   27 d   11 d   27 d
Port : P1  12 d   28 d   12 d   28 d
T.S. : 01  13 d   29 d   13 d   29 d
           14 d   30 d   14 d   30 d
Confirm?Yes 15 d   31 d   15 d   31 d
           16 d   32 d   16 s
  
```

<< Press ESC to return to Controller Setup menu, then Press D to active >>

Set up the backup mode in the Secondary backup site 8DBRA card.

```

SLOT 4 8DBRA P1          === Backup Setup ===          17:09:12 12/01/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Backup Type : Dual Host
Site       : Secondary
  
```

It is not necessary to map any ports at the Secondary backup site.

```

SLOT 4 8DBRA P1          === Port Map Setup ===          17:10:57 12/01/2010

This is Secondary site of Dual Host, don't need set map!

[Display]
Port TS: 1      9      17      25      32
VP4 MAP: 12345678
  
```



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At the Secondary backup site, map the incoming T1 DS-0 time slots to the 8DBRA Virtual Port 4. VP4 is the only port you can chose when mapping to a card set to be the Dual Host Secondary.

```

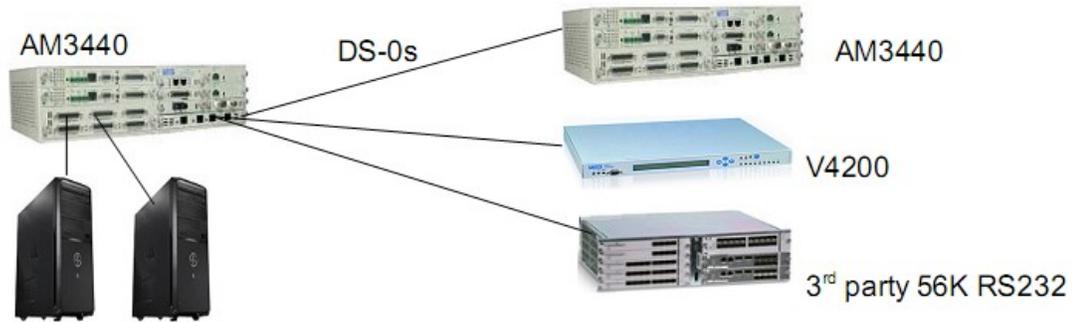
LOOP AM3440-C          === System Setup (MAP) ===          17:14:15 12/01/2010
Please Input decimal number (1~32), BACKSPACE to edit
MAP NO: MAP_1
Target      8BDRA
PO/TS D SL/PO TS PO/TS D SL/PO TS PO/TS D SL/PO TS PO/TS D SL/PO TS
Slot : 4 =====
Port : VP4 4 1 d 1 4 1      17 d
T.S. : 01 4 2 d 1 4 2      18 d
           3 d                19 d
           4 d                20 d
T.S.# : 1      5 d                21 d
Clear : No     6 d                22 d
d/v   : d      7 d                23 d
           8 d                24 d
           9 d                25 d
Source      10 d                26 d
Slot : A     11 d                27 d
Port :       12 d                28 d
T.S. : 01    13 d                29 d
           14 d                30 d
Confirm?Yes 15 d                31 d
           16 d                32 d
  
```



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1+1 Card Backup



SCADA Primary & backup hosts
 using a 1+1 Card Backup
 (2 8DBRA cards)

Backup cards are in adjacent slots, such as 1 & 2, 3 & 4, 5 & 6, 7 & 8, 9 & 10. The odd numbered slot is primary, the even numbered slot is the backup.

First set the back up mode in both cards.

```
SLOT 3 8DBRA P1          === Backup Setup ===          17:31:56 12/01/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Backup Type : 1+1 Card Backup
Mode : revertible
Force Switch: NO
Status : Working
```

```
SLOT 4 8DBRA P1          === Backup Setup ===          17:32:50 12/01/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Backup Type : 1+1 Card Backup
Mode : revertible
Force Switch: NO
Status : Stand-By
```



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Now map the odd numbered card. The map is automatically propagated to the second card.

```

SLOT 3 8DBRA P1          === Port Map Setup ===          17:47:32 12/01/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

[Setup]
Virtual Port: P1
TS start      : 03
Total TS     : 01
RS232 Port   : 1
Command      : Set

[Display]
Port TS: 1          9          17          25          32
VP1 MAP: 11iiiiiii iiiiiiii iiiiiiii iiiiiiii
VP2 MAP: 22iiiiiii iiiiiiii iiiiiiii iiiiiiii
VP3 MAP: iiiiiiii iiiiiiii iiiiiiii iiiiiiii
  
```

Map the Virtual Ports to the DS-0 time slots as described previously in this document. Now the same port number in either card can be connect to a polling host. Polls from either host are broadcast out to the remote drop locations. All poll responses from remote locations come out the same RS232 port number to the polling host on both cards.

