



DSX Modem Installation Manual

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Modem 02/05

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Note/// DSX Modems are the only modems that are guaranteed to work with your DSX system. Other modems may or may not function properly with the DSX Software or Controllers. Please do not call DSX for modem assistance if you are not using DSX Modems!

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Modem Operation Overview

The DSX System is capable of communicating with multiple remote locations via dial-up phone modems. A baud rate of 9600 is required for DSX Intelligent Controllers. Each location may be treated as a separate system, or locations may be grouped together to form a larger access control system. Since the system is fully distributed and does not require a PC for operation, there is no loss of performance in systems using dial-up phone modems. All controllers retain all capabilities including card access, anti-passback, and I/O Linking.

The PC may be programmed to routinely poll each modem-controlled remote location from 10 to 65,534 minutes. Poll Times set lower than 10 minutes can affect the performance of the system. Routine Polls provide verification that communications are still functioning and the collection of history logs. If the PC fails to connect with a modem location on three consecutive attempts, a Location Communications Loss alarm is generated at the PC and an optional action message can be displayed instructing the operator on what action to take.

If the PC is not programmed to routinely poll the location Master, the Master controller can be programmed to automatically store all transactions until the history buffer reaches 80% of capacity. When the buffer is at 80%, the Master controller calls the PC to upload all transactions.

If an alarm event occurs, the Master will initiate a call to the PC to report the alarm event regardless of its buffer status. If the Master controller is reset for any reason, it will automatically call the PC and request a full parameter download to ensure proper operation.

When database changes occur, the system will initiate a call to the remote site at the earliest time possible when the modem and phone line are available. The System can be programmed to delay downloads for a programmable number of minutes or set for after hours downloading which defers the downloads until the first convenient time between the hours of 1:00 and 5:00 AM.

Modem Recommendation

DSX recommends the DSX series modems for dial up phone line or leased line communications. This series of modems are small dial up phone modems that may be powered from the 12VDC Reader Port 12V output of the DSX Controller. By powering the modem from the controller, the modem is battery backed up so that communications will occur even during an AC power loss.

DSX configures and initializes all modems before shipping. They are shipped with everything necessary for installation. These are the only modems DSX will support. Other modems may or may not work properly.

Phone Call Description

During an incoming call at the PC, the modem transmits a ring signal to indicate that the line is ringing. The PC then commands the modem to go Off-Hook (OH). The two modems form a link by transmitting a carrier tone through the phone line. At this time, the modem will turn on the Carrier Detect (CD) light. Communication will then proceed between the Master and the PC at the

defined baud rate. The PC is always responsible for dropping the connection (hanging up the phone). The Master's modem hangs up when the connection is dropped.

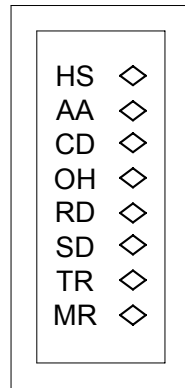
The PC modem must be initialized before it will function properly. Each time the communications program is started, and before each outbound call, the modem is automatically initialized. If the modem loses power, or is turned off and then back on, it must be re-initialized. To manually re-initialize the modem, perform a manual connect and disconnect or exit the communications program and return.

Communication Security Password (Location Password)

WinDSX downloads the Communication Security Password (Location Password) into the non-volatile memory of the Master Controller. Once the Master Controller is downloaded with the Location Password, the password is required for all dial-up modem communications to that location. The Location Password entry is located under Location in Database. In the WinDSX Software the Location Password is not downloaded into Direct Connected Masters.

Changing the password requires knowledge of the password and communication with the Master Controller using KB2CW.exe. This terminal emulation program will prompt the operator to enter the password and then allow the operator to change it by issuing the PW command. To change the password without exiting the DSX program requires completely resetting the controller by powering the controller down and up.

DSX Modem LED Operation



- | | |
|-----------|--|
| HS | Always On when initialized at 4800 baud or higher. |
| AA | On at PC when call is ringing in. Stays On at Controller once Controller has initialized. Modem to answer on third ring. |
| CD | On during communication session. |
| OH | Normally Off and turns On when the modem goes off hook. |
| RD | Normally Off and flashes On to indicate the PC is receiving from the modem. |
| SD | Normally Off and flashes On to indicate the PC is sending data to the modem. |
| TR | Always On and flashes at PC before connecting and disconnecting. |
| MR | Always On at PC and at DSX Controller when modem has power. |

Modem to PC Connections

DSX Modem to PC Comm Port 1 or 2

Use supplied AT modem cable to connect the modem to Comm 1 or 2 on the PC.

DSX Modem to Digi Board

Use supplied AT modem cable to connect the modem to the outboard serial connection a Multi-Serial-Port Communications Board.

DSX Modem Power Connections at PC

Use the supplied DC power adapter to power the modem when used at the PC. Connect the DC power adapter to the same AC power source as the PC.

PC Baud Rate

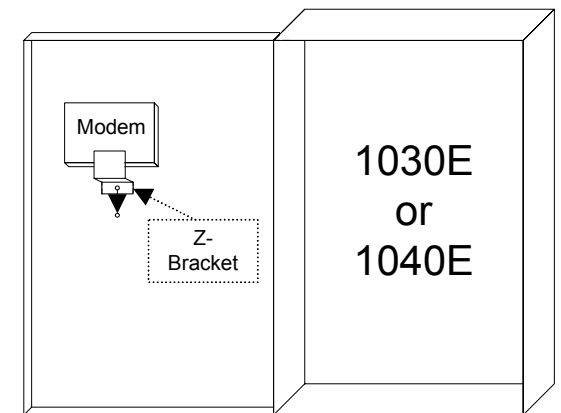
At the Host or Comm Server PC, set the communications port baud rate to match the baud rate set in the Master Controller, which is typically 9600 baud.

Modem Power Sources

The DSX modem will accept AC or DC power. Power the modem from the I/O board 12V Reader power output when used at a DSX-1022, DSX-1020 series, DSX-1032 or DSX-1042 controller. When the modem is placed at the PC use the supplied plug in power adapter.

Modem Mounting in DSX Enclosures

When the DSX Modem is used with a DSX-1032, DSX-1033, DSX-1034 or DSX-1040 Controller it can be mounted in the enclosure using the supplied Z- bracket. The Z-bracket is installed over the top left mounting stud on the door of the enclosure. Loosen the nut with an 11/32" nut driver and slide the keyhole slot of the Z-bracket over the loosened nut and stud and tighten the nut. The bracket when installed properly forms a pocket between it and the door of the enclosure and holds the modem securely. Slide the modem between the bracket and the enclosure door so that the LEDs on the front of the modem are facing to the left and the connections on the back to the right. Once the modem is in place tighten the top left mounting nut.



Modem in DSX-1030 or 1040 Enclosure

Mounting the modem in other DSX Controllers may not allow the Z-Bracket to be used. The modem will set in the bottom of a DSX-1020, DSX-1021 or DSX-1022 Controller.

Modem to DSX-1040, 1032, 1033 and 1034 Connections

Master Controller Communications Port

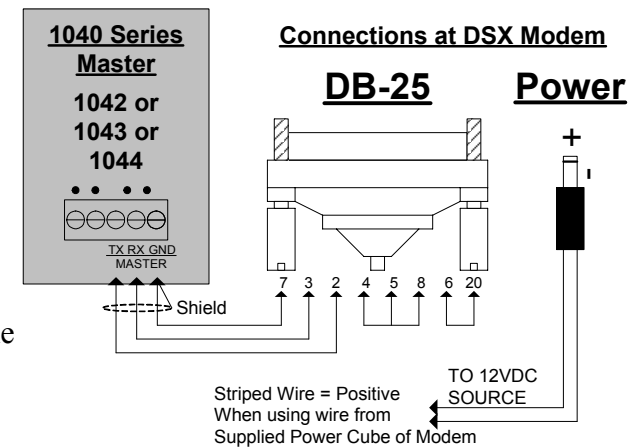
The DSX-1040, 1032, 1033 and 1034 controllers use the RS-232 port on the Master communications terminal block at the bottom of the I/O board to connect a dial-up phone modem to the controller.

Modem Power

The DSX-1040s, 1030s, and 1020s include 12VDC power outputs compatible with the DSX dial-up phone modems. Meter the power wire to determine the positive and negative side. (The tip of the power plug is positive and the base is negative.) If power is reversed to the modem, damage will occur.

Data Connections

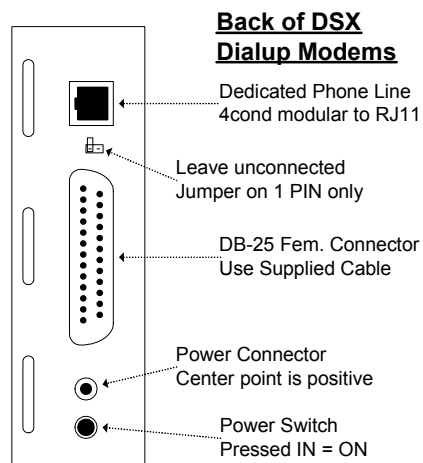
To connect the modem to the controller, cut the male DB-25 connector from the supplied modem cable and connect it to the controller using the diagram above and secure the 25 pin connector to the modem.



DSX Modem to DSX-1022, 1021/1020 via MCI

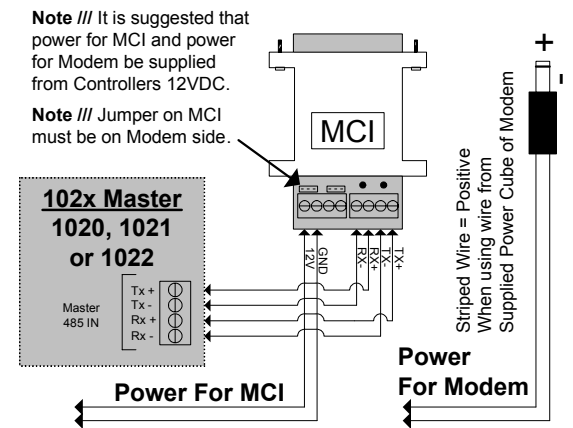
Connect the MCI Module to the 1022, 1021/1020 as shown on the Diagram below, connect the DB25 female connector on the MCI to the supplied DB25 female to male Gender Changer, connect the other end of the Gender Changer to the Dial-Up Phone Modem. The power connections are made with the wire and connector cut from the supplied DC adapter.

Telephone Line Connections



Connect the Dedicated Telephone Line from the RJ11 termination jack into the connector labeled Line. Do Not share the telephone line with any other equipment such as FAX machines or Elevator Phones. Observe proper phone line polarity. Tip/Green is Positive 48-52 VDC. Red/Ring is Negative 48-52DC.

Connections at DSX Modem



Initial Modem Communications Procedure

Follow these steps when establishing modem communications to a dial-up location for the first time.

Note /// A Terminal Emulation Program is installed during each installation of WinDSX software.
In current WinDSX it is known as KB2CW.exe.

A: To Configure the Master Controller with the PC's Phone Number while in the Field:

1. Confirm that all connections for the modem at the Master Controller and the modem at the PC are made according to the instructions in the Manual. The Modem at the controller should get its power from the 12 VDC card reader terminals.
2. Power the Master Controller up and wait. After initial power up the Master Controller will force the modem off-hook and will attempt to dial out.
3. After the dialing attempt, which fails because the controller does not yet know the PC's correct phone number, unplug the Host terminal block that connects the modem to the Master Controller. This should be done at the DSX Controller and not at the Modem. Now the Modem is ready to receive a call from the PC.

4. Once the Modem at the DSX Master Controller answers, plug the Host Port terminal back into the DSX Controller. This will allow the DSX Controller to receive the download.

B: To Pre-configure the PC's Phone Number into the Masters Controller's non-volatile memory:

1. To have the Master Controller automatically dial out upon initial power up at the job site, the PC's phone number must be entered into the Master Controller ahead of time. The Master Controller can be connected directly to a PC or Laptop at the office or in the field and with the use of KB2CW.EXE a phone number can be programmed into non-volatile memory. The Controller, upon power up will automatically call the PC using the stored phone number and request a parameter download.
2. Start KB2CW.EXE, go to "Comm Port", "Define Port", Enter the Port number that is being used to connect the DSX Controller to the PC or Laptop, and then click "OK".
3. Press the "Enter" key 4-5 times, a DSX prompt (DSX>) should appear on the screen. At the DSX prompt type in "SP" and press "Enter". The PC phone number (up to 16 digits) can now be programmed into the non-volatile memory.
4. For more instructions on the KB2CW.EXE program and what can be changed by this program, see the KB2CW.EXE section in the DSX Hardware Installation Manual.

Modem Compatibility

Below is a list of modems sold by DSX over the years and what initialization strings were required to make them work at both the PC and the Master Controller. If the Software and Firmware is updated it may be necessary to set the old initialization strings back into the software on the PC or firmware in the controller. If a newer modem is added to an existing site it may be necessary to set the newer init string into the existing controller. On the following page is a list of initializations strings for the different firmware and software versions and a list of modems sold at that time.

Existing Modems

The WorldPort 1200, 2400, and 9600 baud modems are not compatible with the new DSX modems and software. A baud rate of 9600 is now required for communications. If you are using these modems and are updating firmware the old controller initializations strings must be maintained with the new firmware. Before updating, query the controller using KB2CW.exe and view and document the current initialization string. Install the new firmware and use KB2CW.exe to set the old modem initialization string back into the controller if necessary. **Note** /// If these modems do not operate consistently or in a stable manner they must be replaced.

Note /// A Terminal Emulation Program is installed during each installation of DSX software. In current WinDSX it is known as KB2CW.exe.

Modem Initialization Strings

Software	Firm -ware	Modem	PC Init String	Controller Init String
<9.98E	<257	Worldport 9600 v.32	Atx0m1v0q0e0s0=0&d2\N0	+++~at atz ~atm1q1e0s0=3 s7=45&d\n0 ~atdt%
>9.98E	>257	Worldport 9600 v.42	Atx0m1v0q0e0s0=0&d2&m0&b1	+++~at atz ~atm1q1e0s0=3 s7=45&d&m0 ~atdt%
		Worldport 14400V42	Atx0m1v0q0e0s0=0&d2&m0&b1&k0	+++~at atz ~atm1q1e0s0=3 s7=45&d&m0&b1&k0 ~atdt%
>11.00 <11.00M		AS-14400	Atx0m1v0q0e0s0=0&d2&k0\n0 LMD 2	+++~at atz ~atm1q1e0s0=3 &d&k0\n0 ~atdt%
>11.00M	>297	CT-14400 CT-33.6	Atx0m1v0q0e0s0=0&d2&k0\n0	+++~at atz ~atm1q1e0s0=3 &d&k0\n0 ~atdt%
WinDSX	>297	DSX	Atx0m1v0q0e0s0=0&d2&k0\n0%E0	+++~at atz ~atm1q1e0s0=3 &d&k0\n0 ~atdt%

0=Zero, all 0's in the chart above are Zero

Changing the Modem Initialization String for the PC

If using WinDSX change the modem init string in the Comm Port definitions under System/Setup in the DataBase program.

Modem Speaker Volume

To disable the modem speaker, substitute M0 for M1 in the MIS string. To increase the volume of the speaker, add L2 to the MIS string after the M1 command. 0=Zero

Resetting the Modem

When making the above changes it may be necessary to reset the modem before the changes will work properly. To do this, use KB2CW.exe from the WinDSX directory and connect the modem to the PC's serial port. Run the KB2CW.exe program by double clicking on it through Windows Explorer. Select Comm Port from the menu. Enter the appropriate port number and baud rate (9600, 8, 1, N) and click OK. Next type AT&F and press Enter. The modem should respond "OK". It may take several attempts at resetting the modem for it to respond "OK".

Default Baud Rates

Firmware Version 500 and higher have only one baud rate and it is used for both modem and direct connect. The default baud rate for Version 500 and up is 9600.

KB2CW.exe Terminal Emulation

Modifying the Controllers Communication Parameters

There are a number of parameters that can be changed and set in the non-volatile memory of the controller. These parameters can be viewed and changed without the use of the software. The communications speed is pre-set to 9600 baud and cannot be changed. The Location number can be changed to a number higher than the dip-switch will allow. The PC's phone number and the modem initialization string can also be viewed and changed. The Location Password can also be changed in this terminal mode of operation.

In order to view or change data stored in the controller, use a dumb terminal or a PC running a terminal emulation program such as KB2CW.exe. This is accomplished by connecting the serial port of the Master Controller to the serial port on a Laptop or PC. Use the terminal emulation program that accompanies the WinDSX software. This terminal emulation program is called KB2CW.exe and is in the WinDSX directory. KB2CW.exe does not need the WinDSX software to operate and can be copied to a Laptop or PC not containing the software.

The following will show the steps required to view and change some of the controller settings using a PC running the terminal emulation program KB2CW.exe on Comm Port 1.

To Run KB2CW.exe

1. Make the necessary connections from the PC to the Master as a direct connect system. Also verify that the mode dip switch(es) on the Master are set with 8 On (Master Direct Connect).
2. Using Windows Explorer find the WinDSX directory and locate the KB2CW.exe file and double click on it.

Select Comm Port from the menu at the top and set the port number to match the port used. Then set the Baud Rate to 9600, Word to 8, Stop Bits 1, and Parity to None.

The program should return a message that displays the port, baud, data length, stop bit setting and show a single line flashing cursor. If you receive a message that says: "Port Could Not Be Initialized", there is a hardware problem with the PC or the Communications Server application (CS.exe) is still running, keeping the port reserved for CS and must be corrected.

3. Press the Enter key three times. You should then see a DSX> prompt returned from the Master Controller. If you do not get this prompt, refer to the trouble shooting section of this manual.
4. Once you have the DSX> prompt, type "?" and then press (Enter). This will show the command list from the Master Controller. The controller will return the following list of valid commands:

Type: “?” and press Enter (DSX>?) The Following information is displayed:

Valid Commands:	Description
? Command List	(Displays the command list)
V Version & Misc	(Show Firmware Version and stored parameters)
CR Card Reader	(Show data received on card reader ports)
TD Dump	(List all memory tables)
LO Enter Location	(Set Location number to 128 and up)
MD Memory Dump	(List all memory addresses)
RE Reset modem defaults	(Reset init and baud to factory defaults)
MI Enter Modem Init Seq	(Customize modem initialization sequence)
MB Enter Modem Baud	(Enter new default modem baud rate)
SP Set Host Phone	(Program phone number of Host PC)
MF Mem Fill	(Used in development only)
EM Enter Mode	(Used in development only)
DI Dump Inputs	(Used in development only)
CS Dump Table Checksums	(Used in development only)
PW Enter Password	(Used to change the Location Password at the Master)

To Display Current Settings

Type: "V" and press Enter (DSX>V)

The Following information is displayed:

Version	552 9/3/1999
Current Time	5/1/2000 8:34:47 Mon
Addr	Master 1
DIP Switch	10000001
Phone	PC's phone number here
Modem/Lan Baud	9600 9600
Modem Default	+++~AT ATZ ~ATM1Q1E0S0=3&D0&K0\N0 ~ATDT%
Modem Current	+++~AT ATZ ~ATM1Q1E0S0=3&D0&K0\N0 ~ATDT%
Cyc/sec	212
Polls/sec	52
Missed Polls	0
Stack	850 330
Ram/EQ/AQ/DQ	64 40 10 5779
Cpu/ioBrd	4 2
Rdr types	14 88
Last/Max DL secs	15 91
Re-broadcast EvQ	20 0
Table CS	17716676
Pc CS>	NO:0 OG:0 HO:0 FA:0 OL:0 TZ:0 AL:0 DG:0 CO:0
My CS>	NO:146879 OG:490 HO:2037 FA:1178 OL:1777 TZ:68939 AL:36 DG:10 CO:2996542
Recs>	NO:10 OG:19 HO:1 FA:5 OL:89 TZ:4 AL:5 DG:5 CO:25
Size>	NO:12 OG:68 HO:20 FA:12 OL:132 TZ:36 AL:68 DG:36 CO:1028
BF:0000	
Sort	state (0=off) : 0 index: 0
Delete	state (0=off) : 0 index: 24
Checksum	state (0=off) : 0 index: 25

Changing the Modem Initialization String in the Master Controller

5. You may customize the modem initialization sequence sent by the Master. This may be necessary when modems, other than those recommended by DSX, are used in the system. To change the modem initialization sequence, from the DSX> prompt of KB2CW, type in MI and then press Enter. The Master Controller will return Enter Init Sequence: Type in the initialization sequence that you want to be sent to the modem and press Enter.
6. To view the stored modem initialization sequence, type V and then press Enter. The default init string is the initialization string stored in the firmware. The current init string is the one that is stored in non-volatile memory and is the one currently used.
7. Type MI to set the current modem init string as shown, when finished press (Enter).
`+++~AT|ATZ|~ATMIQ1E0S0=3&D0&K0\N0|~ATDT%` If you make a mistake, you must start over by pressing (Enter) and then MI (Enter). When complete press (Enter) and type V (Enter) to check for the new "current" init string. (0 = Zero)
8. To quit press Escape. Reconnect the modem and power the controller down and back up.

Restrict Dial-out - Controller

To restrict the modem connected to the DSX field controller from dialing out, remove the “ATDT%” from the controllers’ modem initialization string outlined on the previous page.

Modem Speaker Volume

To disable the modem speaker, substitute M0 for M1 in the MIS string. To increase the volume of the speaker, add L2 to the MIS string leaving M1 in the string.

Resetting the Modem

When making the above changes it may be necessary to reset the modem before the changes will work properly. To do this, use KB2CW.exe from the WinDSX directory and connect the modem to the PC's serial port. Run the KB2CW.exe program by double clicking on it through Windows Explorer. Select Comm Port from the menu. Enter the appropriate port number and baud rate (9600, 8, 1, N) and click OK. Next type AT&F and press Enter. The modem should respond “OK”. It may take several attempts at resetting the modem for it to respond “OK”.

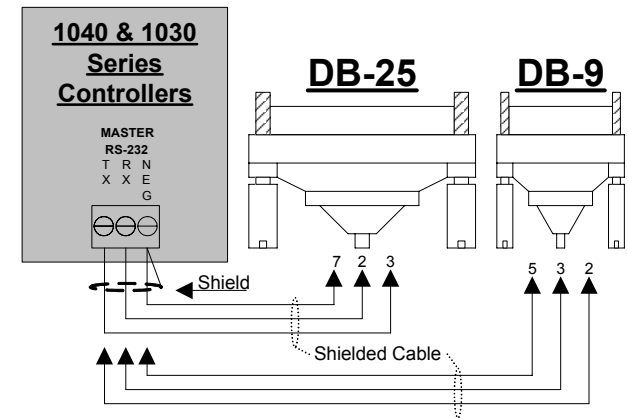
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Direct Connect RS-232 Master Communications with DSX-1040, 1032, 1033 or 1034

RS-232 Master Communications

The RS-232 port, on the Master Controller communications terminal block, is used between the PC and the Controller for direct connect communications. It can also be used to connect a dial-up phone modem to the controller. Direct RS-232 Communications are limited to 50 feet and are connected with a 22AWG 2 pair cable with an overall shield. If more than 50 feet of distance is required from the PC to Master Controller an DSX-MCI or DSX-1035 must be used.

Note /// Shield connects to GND at controller only.



DSX-1040, 1032, 1033, 1034

DB-25	DSX Master
Pin 2 (TX).....(RX) Terminal	
Pin 3 (RX).....(TX) Terminal	
Pin 7 (GND)..(GND) Terminal	

DB-9	DSX Master
Pin 3 (TX).....(RX) Terminal	
Pin 2 (RX).....(TX) Terminal	
Pin 5 (GND)..(GND) Terminal	

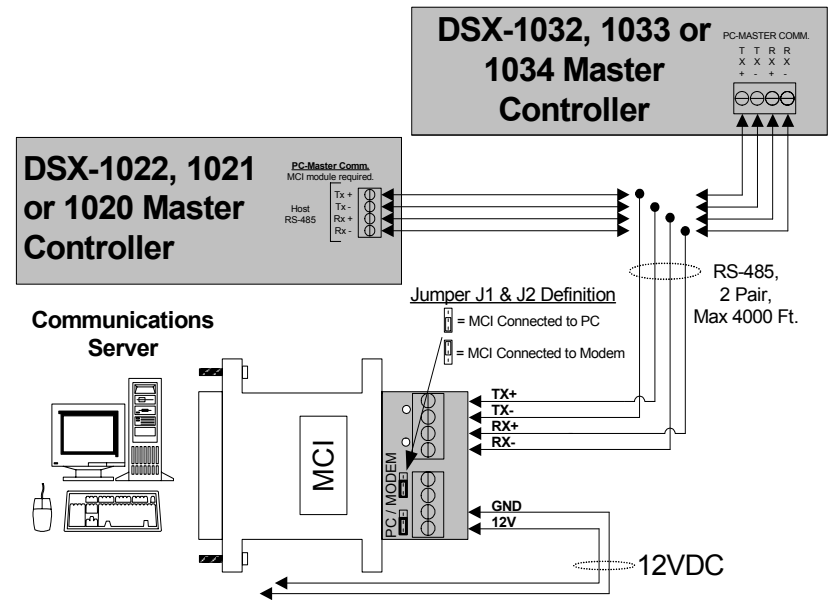
Direct Connect RS-485 Master Communications with DSX-1030s or 1020s

The RS-485 port, on the Master Controller is used to connect the PC to the Master Controller when distances of more than 50 feet are required. This RS-485 Master Communications Port will support up to 4,000 feet on two twisted pair cable. The 1035 or MCI will convert the RS-232 signal of the PC serial port to RS-485 allowing up to 4,000 feet of wiring distance between PC and Master Controller.

MCI Jumpers

The jumpers on the MCI must be set for PC when using the MCI for a direct connect and set to modem when using it for a modem interface.

MCI	DSX Master
(TX+)	(RX+) Terminal
(TX-)	(RX-) Terminal
(RX+)	(TX+) Terminal
(RX-)	(RX-) Terminal

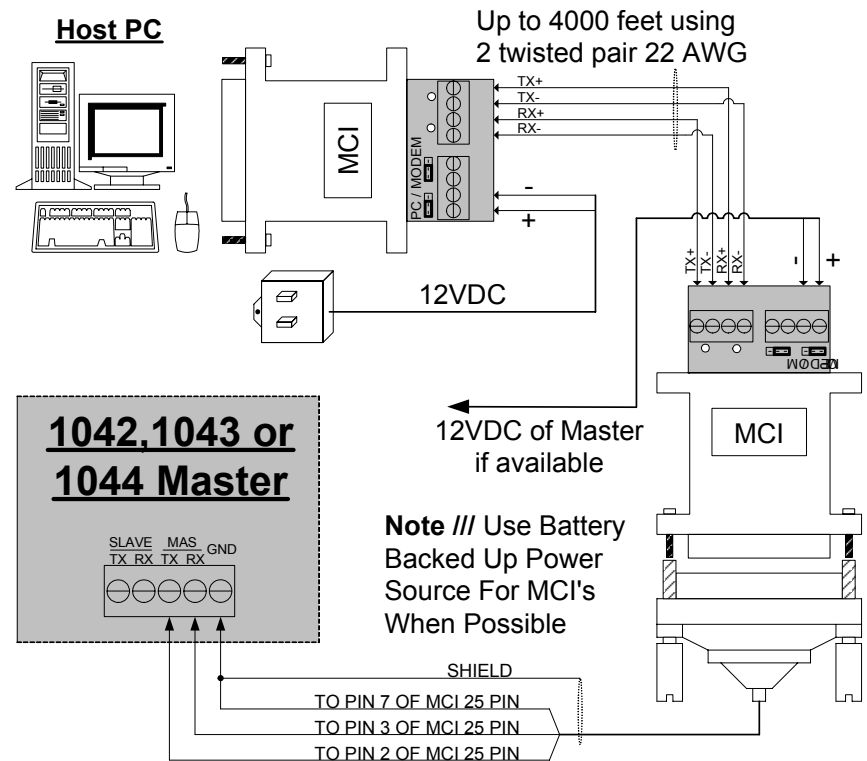


Direct Connect RS-485 Master Communications with DSX-1040s

When a DSX-1042, 1043 or 1044 is the Master Controller and is more than 50 feet from the Host PC two MCI Modules are required. One MCI is connected to the PC's Comm Port to convert the RS-232 to RS-485 and another MCI is located within 50 feet of the Master to convert the RS-485 back to RS-232 in order to supply the 1040 controller with communications.

MCI Jumpers

The jumpers on the MCI must be set for PC when using the MCI for a direct connect and set to modem when using it for Master to modem interface.



Note /// Jumper On MCI's Should Be Placed On PC Side For This

Leased Line Modems

Leased line modems may be used with the DSX System between the PC and the Master or between the Master and Slave controllers. A leased line connection is essentially the same as “direct wire” as far as the system is concerned. There are no special programming considerations for leased line modems. When ordering a leased line for use with the DSX System, you should specify the following items:

- 2 or 4 wire circuit (depending on the modem you are using, 2 wire for DSX modems)
- Analog

The communications parameters used in all aspects of the DSX System that could be used with leased line modems are:

- 9600 Baud
- 8 bit word
- No parity
- 1 stop bit
- Asynchronous

There are many leased line modems that are compatible with these parameters. Be sure to select a modem that will automatically re-establish a connection if it is ever disconnected. This will prevent having to manually reconnect the modems every time there is a short break in service from the Phone Company.

Note /// It is important when using leased line modems or other equipment that these devices do not buffer, perform data compression, error checking, or alter the flow of data in any way.

DSX Modems used for Lease Line Operation

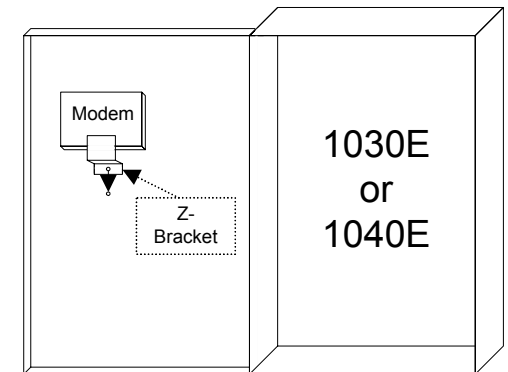
DSX Modems are available pre-configured for two wire leased line connections or point to point communications. The modems will automatically reconnect when reset. Follow the diagrams below to connect the DSX modems for two-wire leased line operation.

Modem Power Sources

The DSX-1040s, 1030s, and 1020s include 12VDC power outputs compatible with the DSX lease line modems. Meter the power wire to determine the positive and negative side. (The tip of the power plug is positive and the base is negative.) If power is reversed to the modem, damage will occur. When the modem is placed at the PC use the supplied plug in power adapter.

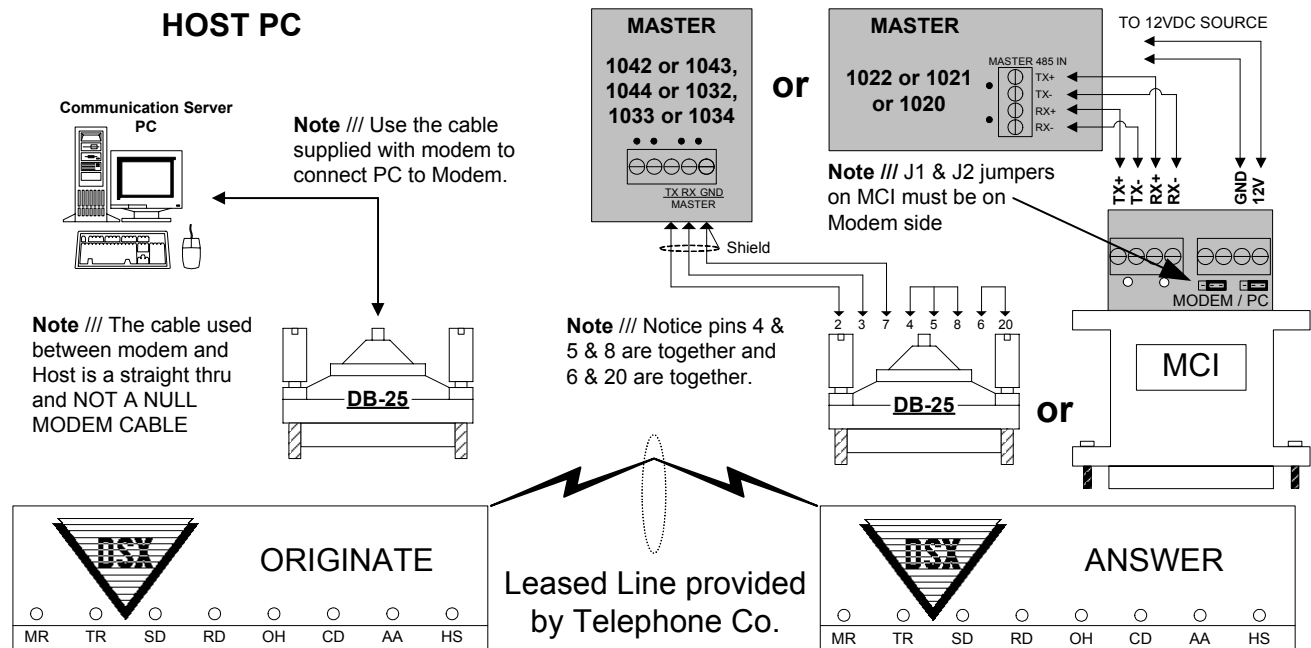
Modem Mounting in DSX Enclosures

When the DSX Modem is used with a DSX-1030 or DSX-1040 Controller it can be mounted in the enclosure using the supplied Z-bracket. The Z-bracket is installed over the top left mounting stud on the door of the enclosure. Loosen the nut with an 11/32" nut driver and slide the keyhole slot of the Z-bracket over the loosened nut and stud and tighten the nut.

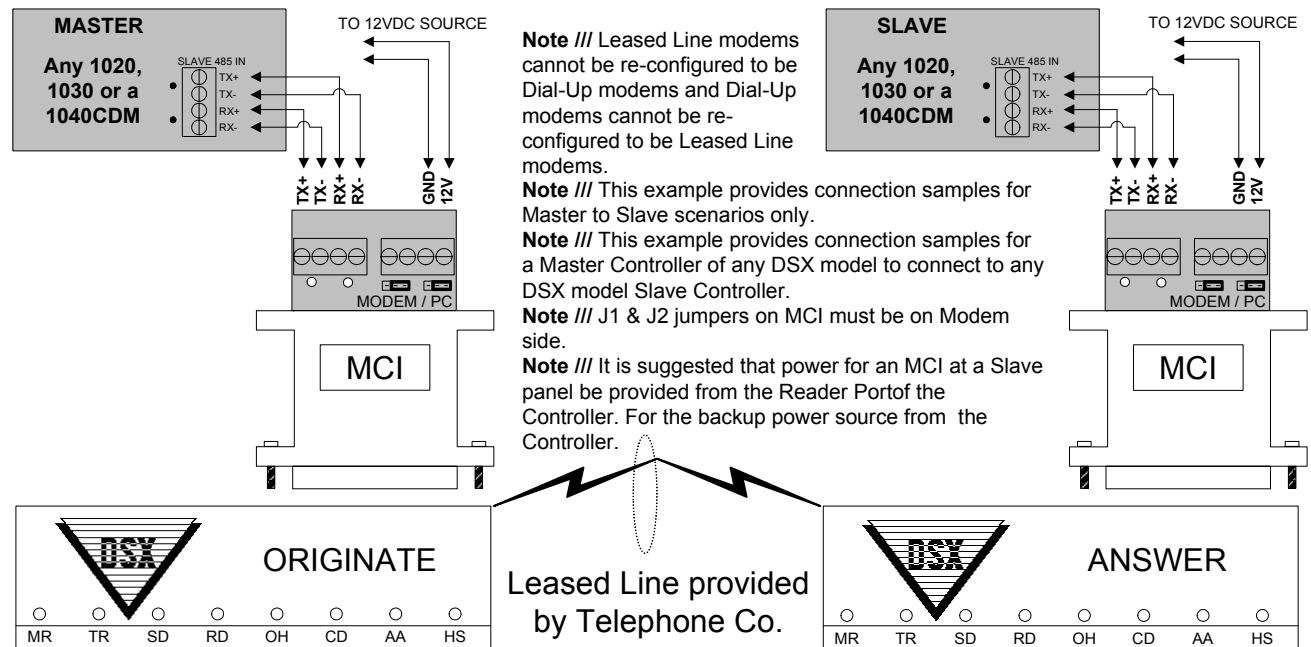


Modem in DSX-1030 or 1040 Enclosure

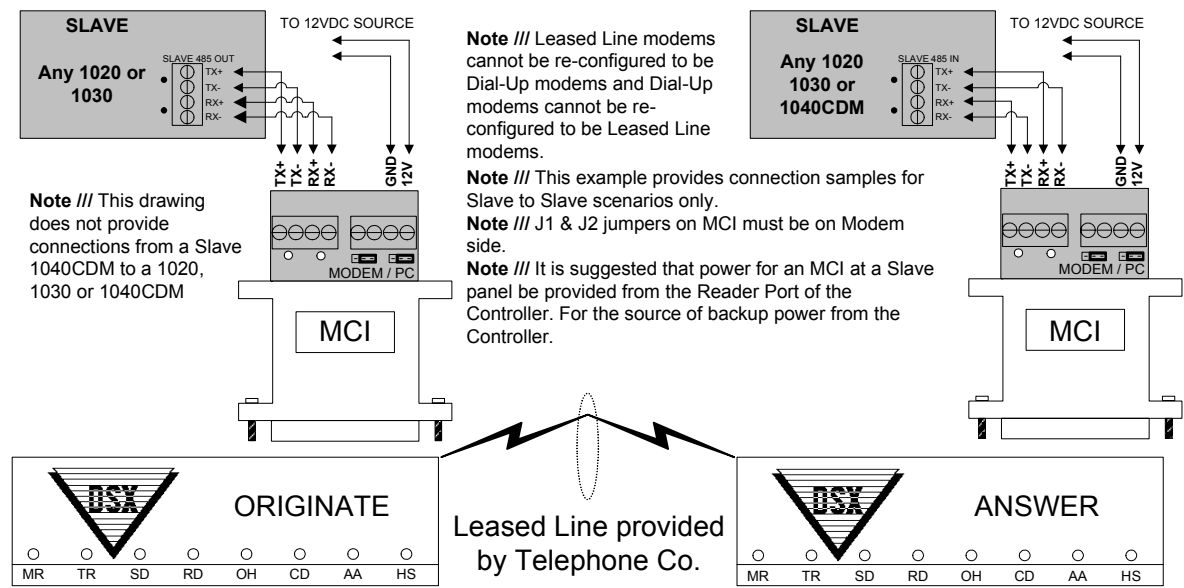
Connecting a Host to a Master Controller using DSX Leased Line Modems



Connecting a Master to a Slave Controller using DSX Leased Line Modems



Connecting a Slave 1020 or 1030 to a Slave Controller using DSX Leased Line Modems



Note /// This drawing does not provide connections from a Slave 1040CDM to a 1020, 1030 or 1040CDM

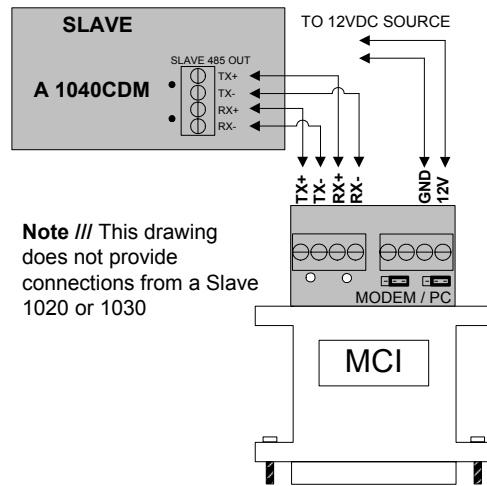
Note /// Leased Line modems cannot be re-configured to be Dial-Up modems and Dial-Up modems cannot be re-configured to be Leased Line modems.

Note /// This example provides connection samples for Slave to Slave scenarios only.

Note /// J1 & J2 jumpers on MCI must be on Modem side.

Note /// It is suggested that power for an MCI at a Slave panel be provided from the Reader Port of the Controller. For the source of backup power from the Controller.

Connecting a Slave 1040 to a Slave Controller using DSX Leased Line Modems



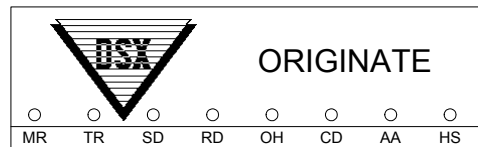
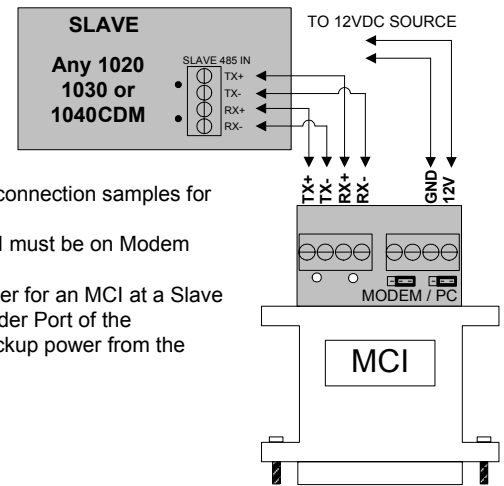
Note /// This drawing does not provide connections from a Slave 1020 or 1030

Note /// Leased Line modems cannot be re-configured to be Dial-Up modems and Dial-Up modems cannot be re-configured to be Leased Line modems.

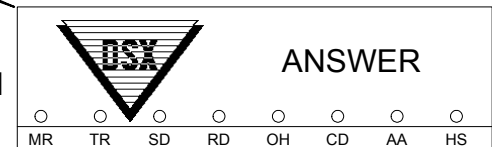
Note /// This example provides connection samples for Slave to Slave scenarios only.

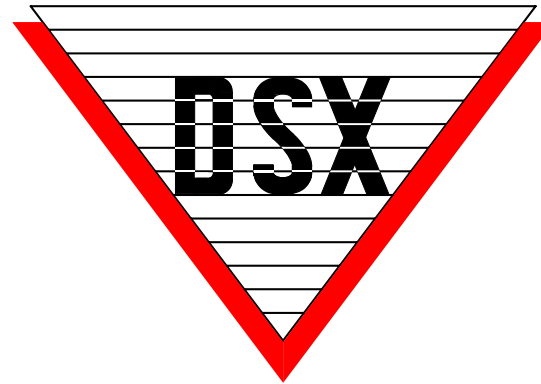
Note /// J1 & J2 jumpers on MCI must be on Modem side.

Note /// It is suggested that power for an MCI at a Slave panel be provided from the Reader Port of the Controller. For the source of backup power from the Controller.



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