Advice on setting up a network

- Leave scanners in Default configuration (point to point comms). Write a macro of K commands to configure them (but do NOT set multidrop at this time). This way they can be set to multidrop temporarily and can easily be reset to default by powering off. They can be stored as multidrop once the system is debugged.
- Use MS 5000 in default configuration if possible (not necessary but it's easier).
- When development is completed the scanners can be configured as RS485 and the set up stored in novram (EEPROM). Clearly mark the address of each scanner with a label.
- The normal configuration of the scanner can be default (except that it must be configured as multidrop and given an address) and the required set-up can be sent down the network to each scanner (K commands) at initialisation. This allows greater system flexibility.
- The maximum string length of commands (e.g. K commands) that can be sent without a pause is 64 characters. Longer strings must be broken up and sent separately with at least a 12 msec pause between them.
- At the end of a string of K commands a <A> (software reset) or a <Z> (software reset and store in EEPROM) must be sent.
- Commands sent to the MS-5000 must be sent as a continuous string and be terminated with a CR.
- Windows TERMINAL program is often used to communicate with the scanners. It can sometimes cause problems when talking to a MS-5000. It also disallows certain combinations of com port settings. Use with caution - If possible use a proprietary communications package e.g. PROCOMM, XTALK etc. Remove all LAN connections to the decoder if RS-232 communication is required. Otherwise the results can be unpredictable.
- If a Service Spare scanner is to be kept on site for fast replacement this can be pre-configured to multidrop address 50 (assuming the system does not use address 50 already). This way if a replacement is required the scanner can be fitted on the line and a service routine can assign the desired address and configuration to the scanner. i.e. address 50 is used as a Service Address.
- On Microscan?s more recent products (710, 820, 850, Quadrus) it is possible to configure them on the network using the proprietary ESP software.

RS-485 Multidrop: Common Practices and Action Plan

In addition to the common practices outline below, we have developed an action plan which can be followed to help with common situations which arise using RS-485. Of course, this plan will require your direct assistance to the customer, time and effort, but if you are having difficulty using RS-485, the results are worth it. If you have any additional ideas or modifications which you feel would help as well, please let us know.

![ID Identify Direct logo]

Common Practices

The following is a list good practices that should be followed when using RS-485 multidrop:

1. Grounding
   Prevent ground loops by making sure that the signal ground between the concentrator and the scanners are common (at the same electrical potential). When using a power supply earth ground at the concentrator and scanner make sure that the earth supply ground is common. This may mean using the same circuit breaker panel.
   The signal ground from the concentrator may be used if a large enough potential exists between the concentrator and scanner earth grounds. This will help to force a common ground for the network.
   When mounting the scanners and concentrator make sure that the case is electrically isolated from possible mechanical noise sources.
2. CablingUse twisted pair shielded cable.Ground the shield at one end only (at the concentrator end).Connect RS-485 lines as described in the MS-5000 concentrator manual.
3. TerminationTerminate the receive + and receive - lines of the last scanner on the network with a 68 ohm resistor as shown below:

scanner
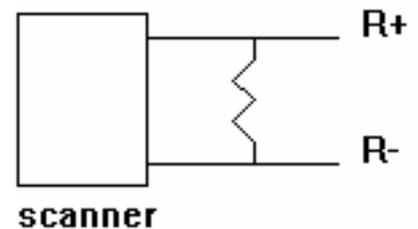
Action plan

Following is the action plan which incorporates the steps which should be followed to help isolate your particular situation. Our goal is to isolate the network one piece at a time which should eventually point to the area of concern.

1. Verify that the common RS-485 practices were used.
2. Ensure that the cabling is terminated correctly as mentioned in step 3 above.
3. Use shielded cable and only ground the shield at one end (typically the host end).
4. Make sure that the cabling is away from any potential noise source including motors, relays, power wiring, and any large metallic surfaces (i.e. conveyer structures).
5. Ensure that there is only one path to ground and eliminate any ground loops by following these steps:
   Isolate the concentrator case and each scanner case from any possible ground source (the scanner case is internally electrically common with the power ground and the signal ground).
   If a problem still exists, then provide a common earth ground to the each scanner and make sure that this earth ground is at the same potential as the earth ground for the concentrator.
   If a problem still exists, then isolate the power ground and signal ground from the case ground by desoldering a jumper on the interconnect board. The scanners may be sent to Microscan if you do not feel comfortable with modifying the scanner at this level.

If a problem still exists then provide the signal ground for each scanner from the concentrator by connecting pin 1 of the LAN connector to the signal ground pin of each scanner.

6. The next step would be to try a Microscan power supply for all Microscan scanners in the network and use the 3 prong plug of the power supply. The Microscan power supply will then supply the earth ground. Undo steps 5b, 5c, and 5d, then go through steps 5c and 5d if necessary.

7. If a problem exists then we should start eliminating all other electrical connections until the only connections are the RS-485 cabling and power. This includes relays, RS-232, etc.

8. At this point if there is still a problem, please feel free to contact the Microscan service department for further assistance.