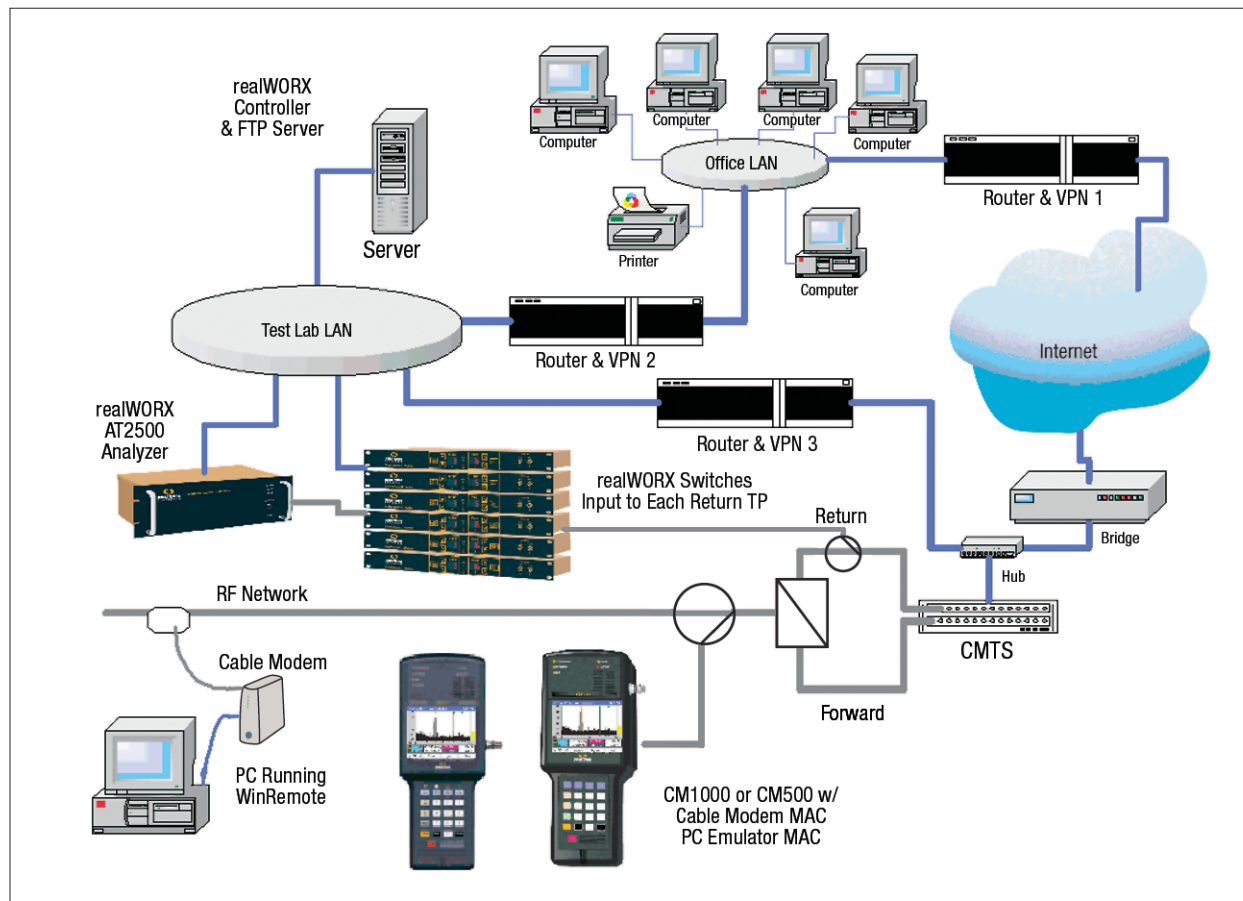


There are a number of methods that may be employed to integrate the realWORX system into a network. The key consideration is to balance network accessibility with security. This paper will discuss one method of achieving the required interface with access to both an in-house LAN and field equipment requiring access via the public network. Many other implementations may be possible.

The following diagram depicts a typical implementation where the Office LAN is connected to the Internet via a router with VPN and Firewall (#1). Similarly, the realWORX system is placed on its own Test Lab LAN, which is connected to the Internet via a router and VPN (#3). The Office LAN and Test Lab LAN can be connected via a router with or without a VPN or the realWORX LAN may be accessed through the Internet from the Office LAN.



Instruments, such as the CM1000, in the field are operated on the public side of the network through the Internet. To access test data from the realWORX controller, a secure connection must be provided. Since the instrument is not PC based, some limitations are imposed on the approach used to secure the network.

MAC filtering is the simplest approach. Each CM series instrument has 2 or 3 MAC addresses. The first MAC address is the address assigned to the cable modem. The second MAC address is used when emulating a PC during some tests; such as FTP file transfers, Web Browser operation, etc. The third MAC address is used by the VoIP option in testing the VoIP services. The second MAC address is used for all data transfers, uploads and downloads.

We will address only the Router VPN 3 setup, as Router VPN 1 is independent and solely up to the discretion of the network engineer and Router VPN 2 is simply a connection between the Office and Test Lab LAN.

The network engineer should select the appropriate IP and subnet masks for the network components prior to beginning the configuration process. Refer to the manuals for each specific piece of equipment for detailed instructions in setting the Ethernet configuration. Obtain the MAC addresses of your CM series meters before you begin the network configuration process.

1. Set up the Ethernet configuration on the AT2500 Analyzer.
2. Set up the Ethernet configuration of the realWORX Controller (PC running realWORX software).
3. If the router offers a DHCP service, be sure to disable this service, since the Test Lab LAN will need to run Static IP address. Alternatively, the static IP address can be assigned outside of the block of dynamic IP address and the DHCP server can be left on.
4. Enter the IP address and port information for the AT2500(s) into the realWORX controller.
5. Enter the IP address and subnet of the router for the Test Lab LAN side of the router.
6. Enter the IP address and subnet of the router for the public side of the router.
7. Enter the routing information into the router to route the public IP address and port to the appropriate realWORX controller IP address and port (both directions).
8. If access to the AT2500 over the public network is desired, enter the routing information into the router to route the public IP address and port to the appropriate AT2500 IP address and port (both directions). This will allow connections to the AT2500 using WinRemote.
9. If other services are provided from the Test Lab LAN, such as FTP or HTTP services for CM series throughput testing, management of configuration files or test results, similarly, enter their routing information.
10. Turn on the MAC address-filtering feature and enter the MAC address of each of the CM series meters used on the network.
11. Enable the firewall.
12. The CM series uses PING tests to ensure that the connection is viable to an FTP site before beginning FTP commands. This avoids long timeout failures in the FTP protocol if the connection fails. This may be turned off in the CM series setup. If it is turned off, you may disable the ICMP PING on the router. If PING before FTP is turned on in the meter configuration, you must leave the ICMP PING turned on in the router.

Be sure to save and enable the router settings.

Set up your CM series meter for the realWORX controller's IP address and port (see manual). Enter a location name, the IP address and port number (the IP and port on the public side of the router).

Make a connection to the network and verify that a connection is established and a list of the available analyzers is offered. Once selected, a list of inputs is offered. Once selected, the CM provides a spectrum view of the return.

Note: To view the PC Emulator MAC Address on your CM series meter follow one of the two instructions:

- Newer CM1000 and CM500 models: Press "SHIFT SETUP (MENU)" key and select the General Setup icon. The second line displayed will be the "PC Emulator MAC" address (i.e. 00 d0 dd 16 19 37).
- Older CM1000 models: Press the "STATUS" key. The last line will display the "PC Emulator MAC" address (i.e. 00 d0 dd 16 19 37).

Also Note: If you are having trouble, use a PC to troubleshoot the network and try turning the PING feature on until everything else is working. You may also want to enter your PC's MAC address into the router's MAC address filter to allow you to use your PC on the network.

Router VPN 2 can similarly be configured to allow connections between the Office LAN and the Test Lab LAN without routing the connection through the Internet.

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