![Globalstar logo]

Globalstar MCM-4M

Single Antenna Multi Channel Modem

Installation & Operation Manual

GS-06-1095 (Preliminary)

Publication Date: 17 January, 2007
Globalstar CAGE Code: 1WSX0

Your System Information:

MCM-4M Serial # :   _____
Antenna Serial # :   _____

VPN Tunnel Name: _____
IP Address: _____

The MCM-4M System is manufactured in the United States by CornerTurn, LLC.

TRADEMARKS:

QUALCOMM® is a registered trademark of QUALCOMM Incorporated.
Globalstar™ is a trademark of Globalstar, Inc.
CornerTurn, LLC products are made in the USA

SAFETY ISSUES:

Your Multi Channel Modem System incorporates radio transmitters, receivers, and an antenna that receives and sends radio frequency (RF) energy.

RADIO FREQUENCY ENERGY

WARNING - The transmitted RF field intensity at the surface of the transmitting antenna is fairly high. Do not use when someone is within 29 inches (0.74 meters) of the antenna.

COMPLIANCE WITH REGULATIONS

Your Multi Channel Modem has been type approved by the FCC. Nonetheless, RF field intensity at the surface of the transmitting Globalstar antenna is fairly high.

- NCRP Report 86 (1986) National Council on Radiation Protection and Measurements

- FCC Radio Frequency Radiation Exposure Limits, 47 CFR Ch. 1 (10-1-98 Edition) Part 1,§1.1310

- ANSI/IEEE C95.1-1992 Standard, American National Standards Institute

- IRPA (1991) Guidelines on Protection Against Non-Ionizing Radiation, International Radiation Protection Association

- ICNIRP (1996), International Commission on Non-Ionizing Radiation Protection

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List of Figures

1.   Operation

Your Multi Channel Modem System is easy to use, versatile, and dependable. When configured properly, all 4 channels can be combined to provide an aggregate Internet connection equivalent to a 28 Kbps modem. If two, three or 4 units are available and configured for cascaded operations you can achieve an aggregate Internet connection equivalent to a 112 Kbps modem. Internet access is available in all Globalstar™ network data services coverage areas except those for China and Nicaragua.

> **WARNING - The transmitted RF field intensity at the surface of the transmitting antenna is fairly high. Do not use when someone is within 29 inches (0.74 meters) of the antenna.**

1.1.   Basic Satellite Information

 Globalstar satellites operate in an inclined orbit of 52 degrees. They come up over a point on the western horizon, move across the sky, and then drop behind the eastern horizon. The average user cannot predict the path of the satellites. Each satellite will pass from horizon to horizon in about 10-15 minutes. When the MCM-4M is located in moderate latitudes (22-52 degrees) it will communicate with at least TWO satellites passing over your geographic location.

This system uses high frequency microwave signals. Unlike television and AM or FM radio signals, or even cellular phone signals, microwave radio signals do not bend and are strictly line of sight. This means that these signals do not go through, or around, dense objects including the platform's own superstructure, wings or masts. It can not go through, or around, other objects adjacent to the platform either (trees, buildings, overhangs, cranes, tall hills or mountains). If something gets between the satellite and the antenna the data connection won't work until another satellite (which is not blocked) is received or the platform moves to a location where your antenna will no longer be blocked by the object. If the antenna is no longer pointed up toward the overhead location of the satellites, the data connection won't work until the antenna has a clear view of the sky above again.

If the MCM-4M antenna's view of the sky above 10° elevation is restricted, the unit will suffer temporary data rate reductions. If the antenna is completely blocked, the signal to/from the satellite will be lost until the signal path is unobstructed.

1.2.   Key Points About Your Equipment

 The MCM-4M provides you with data access over the Globalstar satellite network. In some geographic areas setup, configuration and usage may be slightly different. Subject to certain constraints, the MCM-4M is capable of dial up packet or asynchronous operation in any Globalstar service area. These constraints, and the service limitations, are described in Section 2.

The MCM-4M provides the ability to establish up to four concurrent satellite connections each providing 7.2 Kbps of raw symmetrical bandwidth. The MCM-4M provides the combined bandwidth to the user via a single standard Ethernet connection. The MCM-4M is a full duplex device and can be configured to allow other data terminals to initiate a data communications connection. For this purpose, any of the four SDMs may be configured to receive an incoming asynchronous data call from a PSTN modem. The MCM-4M unit can be connected to up to 3 additional MCM-4M units to provide the combined bandwidth of up to sixteen concurrent satellite connections.
The MCM-4M requires connection to an Antenna Assembly to be mounted on an external surface. The MCM-4M contains an Multi-Channel Processor board and four QUALCOMM GSP-1620 Satellite Data Modems (SDM). The MCM-4M also includes an Ethernet 10 Base-T port, power supplies, converters, and management functions.

The 10/100 BaseT Ethernet port can be connected to multiple remote client terminals through a suitable hub or switch. It provides the path through the Globalstar network for your remote client terminal(s) to communicate. Your connection may be to a public server site or you may be connected to a private site such as a Virtual Private Network (VPN).

In normal operation the MCM-4M provides you with a PATH to and from the Internet, which allows your mobile platform to be connected without having wires attached to it. You operate the remote client terminal exactly the same way you would if it were connected to any other Ethernet LAN. When the MCM-4M is operating normally, it provides the path to and from the Internet and will be transparent to you. Refer to figure 2-1 for an overview of the satellite connection.
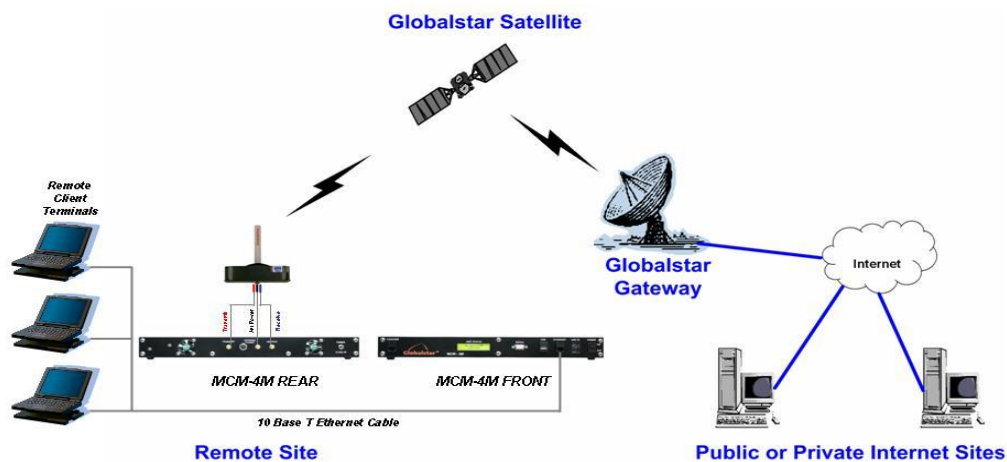
Figure 1-1 MCM-4M being used to connect to the Internet

1.3.   System Start-Up From the Multi Channel Modem (MCM-4M)

Figure 1-2 MCM-4M Multi Channel Modem – Front Panel

1.4.   Using Internet Data Services

To set up the PC computer for data service use, refer to section 4.

1.   To use the Internet Data services for Internet browsing, email and file transfers, open your Internet browser, email or other data program and proceed by operating that program as you normally would to browse, email or efax. Please refer to the accompanying Software and User Documentation for instructions on how to operate the MCM-4M and to turn the tunnel on.

When finished
Close your Internet browser, email or other data program.

1.5. Receiving Incoming Data Calls

The MCM-4M can receive incoming asynchronous data calls from a PSTN modem.
For simple connectivity (in either the 'stand-alone' mode or 'VPN tunnel' mode) the establishment of the incoming asynchronous data call to the MCM-4M can be used to convey the application data between the originating terminal within the customer's private data network and the remote terminal attached to the MCM-4M.

When used in conjunction with the VPN mode, the asynchronous data call to the MCM-4M can be used to force the MCM-4M to initiate the VPN tunnel back to the customer's private TCP/IP data network. In this way, the full bandwidth of the VPN tunnel may be used to transfer large data files more quickly. Once the VPN tunnel has been opened and the data transfer commenced the PSTN data call can be released.

2.   Provisioning the Single Antenna MCM-4M

2.1.   Service provisioning

Each of the four SDMs requires a Globalstar subscription. Note: The Globalstar subscription for each SDM includes the provision of a telephone number that also allows each SDM to receive incoming asynchronous data calls.

2.2.   Roaming Outside of the 'Home' Service Area

Prior to delivery, the MCM-4M will have been configured to operate within the Globalstar service area designated to be you're the 'home' service area.

In addition to being able to operate anywhere within the designated 'home' service area, the MCM-4M is capable of operating within any Globalstar service area with which your Globalstar service provides roaming capabilities.

Although the MCM-4M has the inherent capability of operating within any Globalstar gateway, it may require some minor user configuration changes if it is subsequently required to operate within another Globalstar service area. Some Globalstar gateways support both 'packet data' calls and 'asynchronous data' calls while other Globalstar service areas support only 'asynchronous data' calls. The MCM-4M was designed to operate in 'Packet Data' mode. The MCM-4M can operate in a Globalstar service area that only supports the 'asynchronous data' mode, but at a lower data rate

Notes: For current details of Globalstar's 'packet data' and 'asynchronous data' service areas, refer to Globalstar's web site at http://www.globalstar.com/pages/coverage.html

A call is disconnected when the subscriber leaves the service area of the Globalstar gateway controlling the call. Although 'in-call hand-overs' between neighboring service areas are not supported on the Globalstar system, the MCM-4M has the ability to maintain any VPN tunnels having more than one Internet connection as the MCM-4M enters the neighboring service area. SDMs will disconnect and be automatically reconnected by the MCM-4M to the Globalstar gateway controlling the neighboring service area at different times. Thus, the VPN tunnel is likely to remain established (albeit with reduced bandwidth through the transition period as each satellite modem connection is re-connected via the Globalstar gateway serving the new service area).

Because certain Globalstar gateways have implemented Network Address Port Translation (1-N NAPT) while others have implemented 1-1 Network address translation, the user of the MCM-4M should ensure that the VPN tunnel does not use the IP(in IP) transport but instead uses TCP transport within Globalstar areas where Network address port translation (1-N NAPT) is performed.

3. Installation

This section explains the installation of the components of the Multi Channel Modem System and includes some details about the installed equipment.

Good planning of the installation will provide the best results. Below is some guidance on issues that are important to consider when planning the installation. The major steps in the installation and setup process are as follows:

1. Planning locations of the components
2. Preparing for the installation
3. Equipment and cable installation
4. Initial power-up and checkout
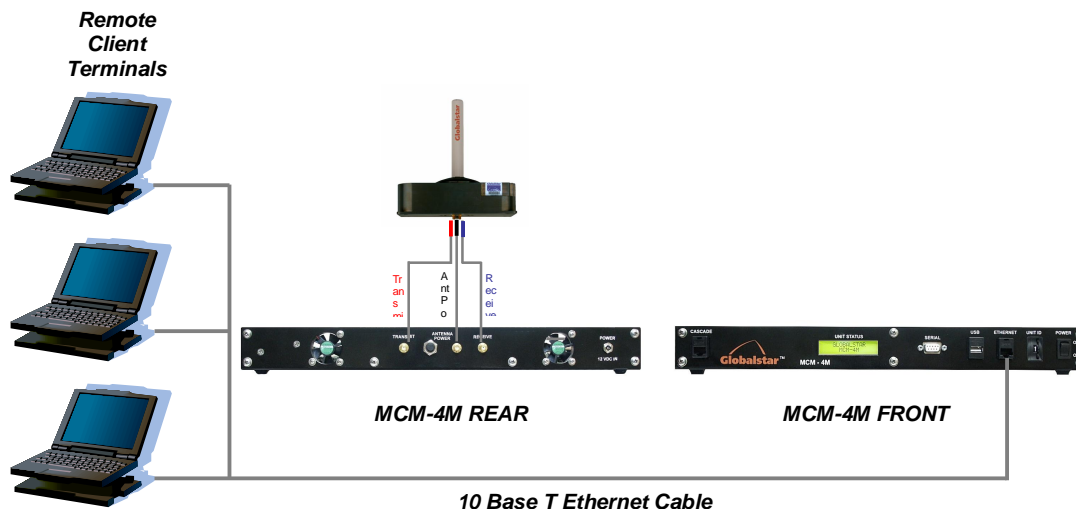
3.1. Components of the System

Figure 3-1 MCM-4M Remote Client Terminal Configuration

The system is shipped comprised of the following items:

1. Antenna –It is essential that the Antenna has a clear hemispheric view of the overhead sky above the platform from about 10 degrees above the horizon.
2. Multi Channel Modem (MCM-4M) – The Multi Channel Modem contains the Multi-channel processor board and four QUALCOMM GSP-1620 Satellite Data Modems (SDM). The MCM-4M also includes an Ethernet 10/100 Base-T port, power supplies, converters and provides the management functions. The MCM-4M is connected to the Antenna by two 30 foot coaxial and one 30 foot antenna power cable. The primary power supply is provided with the unit. The power supply provided is a 110 VAC 60 Hz unit with standard wall socket grounded plug.

You will need to provide the following items:

1.   PC Computer/LAN Components and cables – The Remote Client Terminals, hub/switch, RJ-45 Ethernet cables.

3.2.   Planning Where to Position the Components

Determine where to position the components, how the cables will be routed and that the furnished cable lengths will be adequate.

3.2.1.   Site Selection

Choosing the best mounting location on smaller platforms, where there are fewer possible locations to choose from, is frequently a compromise. The "best" location for the antenna is the one that has no blockage and is not in close proximity to other electronics or antennas that may interfere with the MCM-4M or that the MCM-4M will interfere with.

Sometimes there are situations that you just can't get around. In that case, do the best you can. At moderate latitudes (between latitude 22 degrees and 52 degrees) there will always be two satellites visible at any location.   If an object blocking the antenna's view of the sky is small (that is, blocks only a small part of the sky), it should not cause an outage.

3.2.2.   Single Piece Antenna

Determine the optimum mounting location, on top of the platform for the Antenna. Certain types of antennae used with Global Positioning Satellite (GPS) receivers do not have the appropriate band-pass filter (14.75MHz – 16.75MHz) fitted before the pre-amplifier stage. Use of this type of antennae may cause a GPS receiver to be susceptible to interference from the MCM-4M. Where it is found that a GPS receiver is experiencing interference from the MCM-4M, the distance between the GPS antenna and the MCM-4M should be increased (by relocating one or both). If no suitable alternative location can be found for either the GPS antenna or the MCM-4M, the GPS antenna should be replaced with one that includes the appropriate band-pass filter.   The MCM-4M should be installed where:

- The antenna has a clear line-of-sight view to as much of the sky above the antenna as is practical, down to an elevation of 10 degrees above the horizon. Choose a location where masts or other structures do not block the satellite signal from the antenna as the platform turns.

- The antenna is at least 5 feet away from other transmitting antennas (HF, VHF, GPS and radar) that may generate signals which interfere with the Antenna, or that the Antenna may interfere with. Although radio and radar interference is not common, the further away the Antenna is from these other antennas, the less impact their operation could have on it.

- The Antenna assembly should be rigidly mounted to the platform. If necessary, reinforce the mounting area to assure that it does not flex due to platform motion or vibration

3.2.3.   Multi Channel Modem (MCM-4M)

The Multi Channel Modem Unit can be mounted in a 19 inch equipment rack or used as a table top unit.   The system is supplied with 30 foot transmit and receive coaxial cables and a 30 foot power cable for the remote powered antenna. A 110 VAC 60 Hz power supply and associated power cable to the unit is also provided.

3.2.4.   Remote Client Terminals and Other Networking Equipment

All other equipment should be mounted in suitable locations per the individual customer's requirements.

3.3.   Preparing for Installation

3.3.1.   Inventory

Check the contents of the MCM-4M System package to assure all items on the packing list are received.

3.3.2.   Other Materials Needed

Because each installation is different, some materials and supplies will need to be provided by the installer. These includes screws to mount any additional items, PC Computer(s), LAN components and associated interconnecting cables for these devices also must be provided.

3.4.   Antenna Installation

After you have planned where the components will be installed, the cable routing paths and have inventoried all of the installation materials you will be ready to begin the installation.

Note: 1.   Although the MCM-4M itself does not require any unique technical knowledge to install, the selection of the optimum route for the cabling the Multi Channel Modem (MCM) and the preparation of any cable-entry glands is best carried out by an experienced equipment installer.

Note: 2.   If the MCM-4M is to be installed on an aircraft, it is recommended that only experienced technicians install the Antenna cabling.
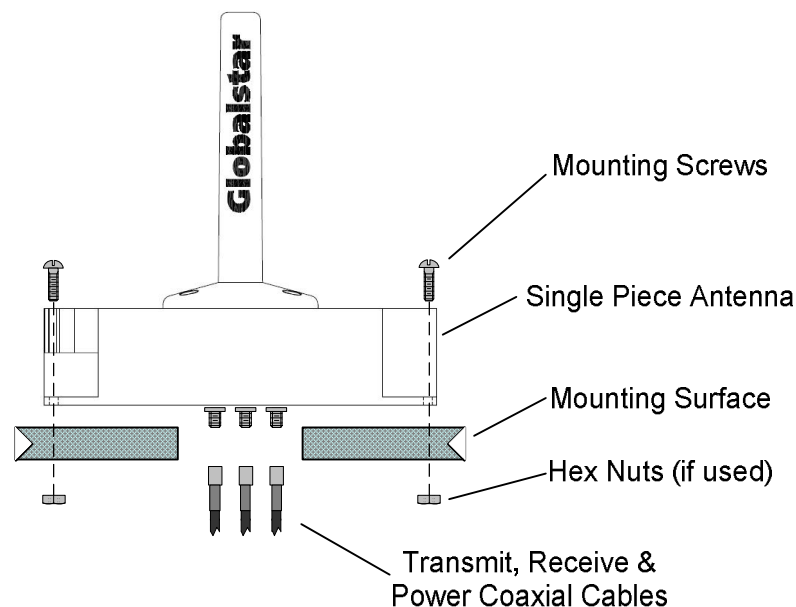

Figure 3-2 MCM-4M Single Piece Antenna Installation

Prepare the mounting surface and mount the Antenna.
1. Drill the mounting holes and cable passage in the mounting surface. The mounting hole may be clear drilled or drilled and tapped.
2. Apply one drop of Locktite to the threads on the end of each of the 4 screws.
3. Mount the Antenna from the outside surface of the platform using the four screws provided. If the mounting holes were drilled & tapped, tighten the 4 mounting screws. If the mounting holes were clear drilled attach hex nuts from inside the platform and tighten. An o-ring gasket is provided with the Antenna; however, silicone sealant (or other gasket material) may also be used if desired.
4. From inside the platform route the 30 foot Transmit (red marker) and Receive coaxial (blue marker) Cables and antenna power cable to the location where the MCM-4M will be installed.
5. Connect the Transmit coax to the TX connector of the Antenna. Connect the Receive Coax to the RX connector on the Antenna. Connect the antenna power cable to the Antenna.

3.5.   Multi Channel Modem (MCM-4M) Installation

Figure 3-3 MCM-4M   Rear Panel

1. Install the MCM-4M in its preferred location.

At the MCM-4M Rear Panel
2. Connect the Receive Antenna coax to the RECEIVE connector on the MCM-4M.
3. Connect the Transmit Antenna coax to the TRANSMIT connector on the MCM-4M.
4. Connect the Power Antenna cable to the ANTENNA POWER connector on the MCM-4M.
5. Connect AC power cord to the 12 VDC Power Supply and connect the power supply to the 12 VDC input connector on the MCM-4M.
6. Route the Primary Power supply cable to the planned location of the AC Power.

 WARNING - *Do NOT connect, or disconnect, any of the coaxial cables to the MCM-4M while system power is ON. Assure that system power is OFF prior to connecting, or disconnecting, these cables.*

Figure 3-4 MCM-4M Front Panel

At the MCM-4M Front Panel

7. Route Ethernet Cable to planned locations of remote client equipment.
8. Connect the Ethernet cable to clients as necessary. The MCM-4M provides one 10/100 Base-T Ethernet (RJ45) port (**ETHERNET on front panel)**. Category 5 (Cat 5) unshielded twisted pair (UTP) cabling will be required to be run between the MCM and remote client terminal.

3.6. RJ-45 Ethernet Cable Routing

Route the CAT5 RJ-45 Ethernet cable from the PC computer/LAN hub, or switch, through the platform as needed to connect planned equipment.

3.7. Turn Power ON

On MCM-4M front panel Turn power **ON.**
The system will initialize and automatically acquire satellite signals, if the antenna is not blocked.

3.8. Install and Setup Remote Client Equipment

Continue with the installation and setup of any remote client terminals. This section assumes that the computers that will be used as the *remote client terminals* already have a LAN card and all required software (Operating System, drivers and Networking software) installed and configured in them. Therefore, the "Setup" instructions below are designed to have a remote client terminal automatically obtain an IP address.
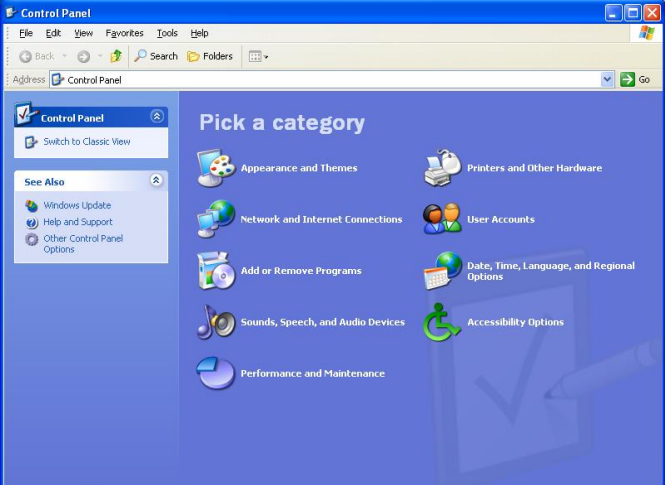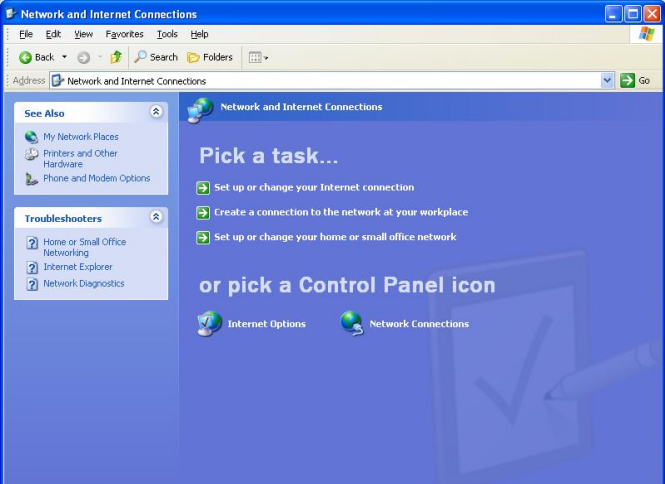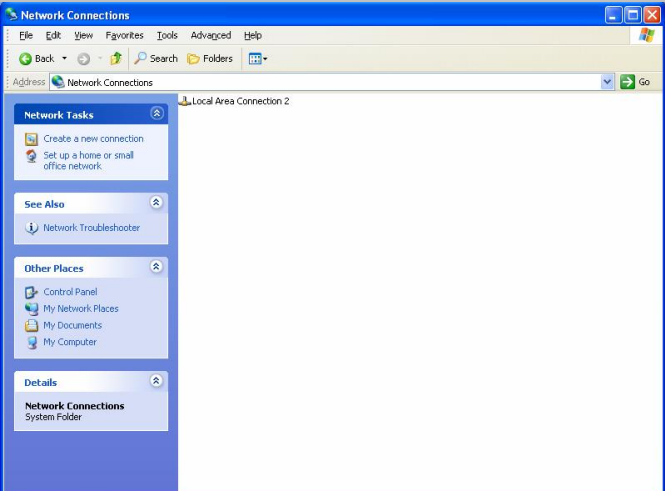
The remote client terminals attached to the MCM-4M should have their IP stack configured to use Dynamic Host Configuration Protocol (DHCP) to obtain their IP address.
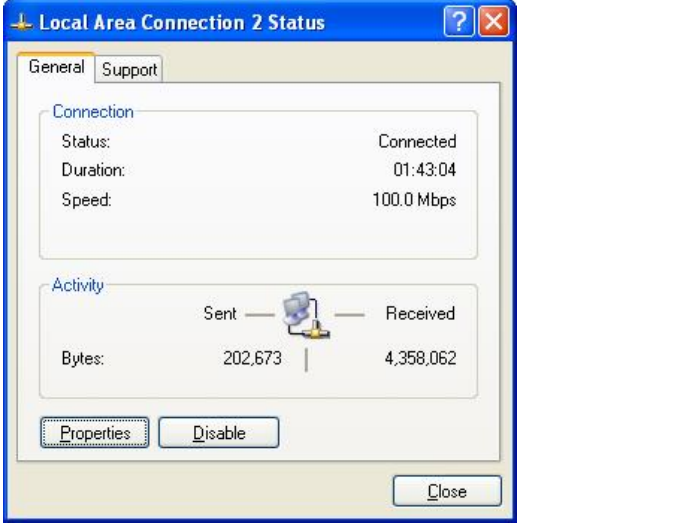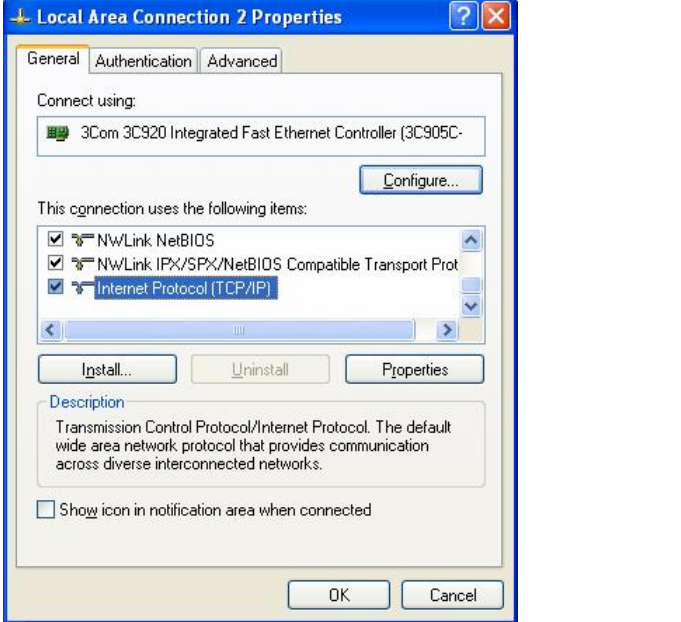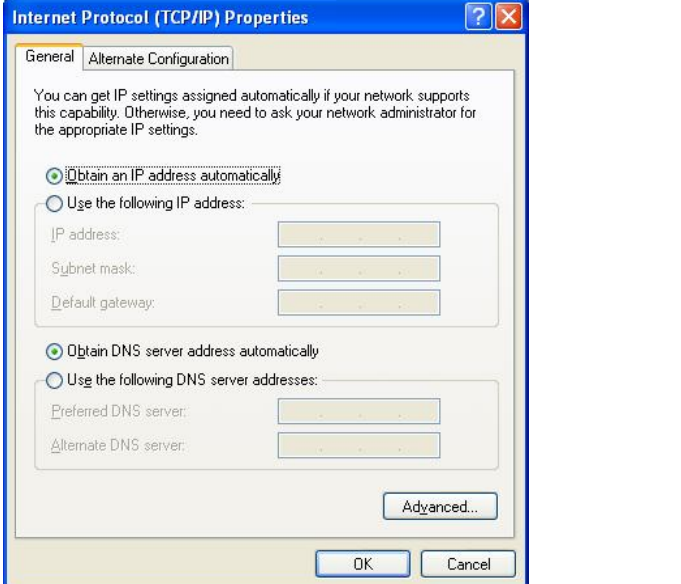
If you need to configure the remote client terminal(s) for specific IP Address or sub-address contact your Network Administrator for assistance in setting up the terminal(s).

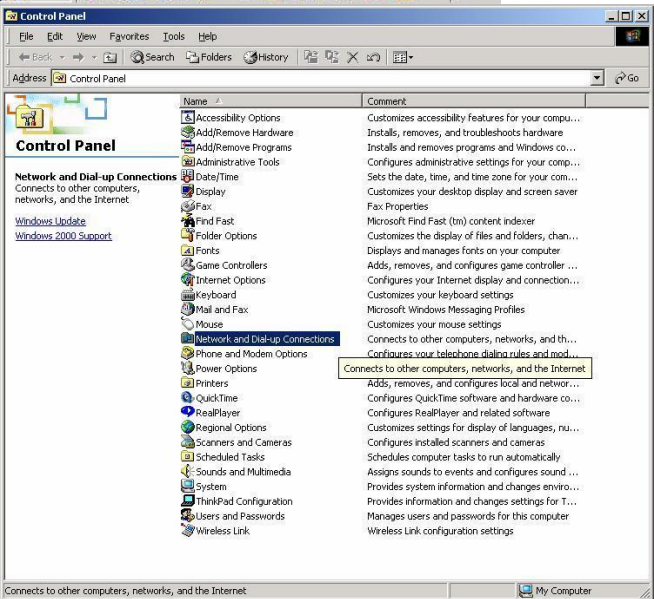Your screen may look different that the ones shown below.

3.8.1. To configure remote client terminals with MS Windows *XP* operating system

1	Click on '***Start***'
2	Select '***Control panel***'

3	Click on the *'Network and Internet Connections'* icon	
4	Click on the *'Network Connections'* icon in the bottom portion of the screen	
5	Double click on the 'Local *Area Connection'* icon	
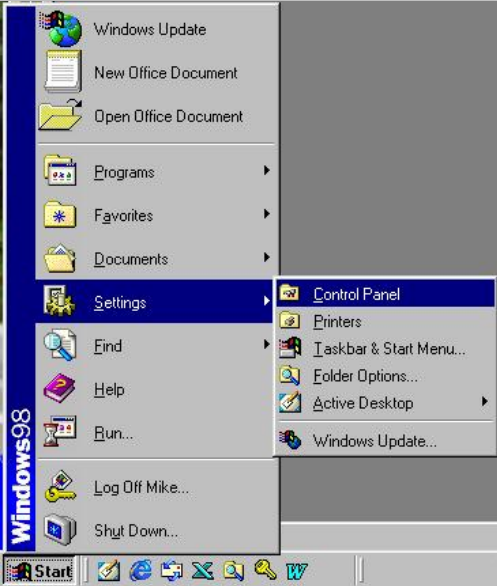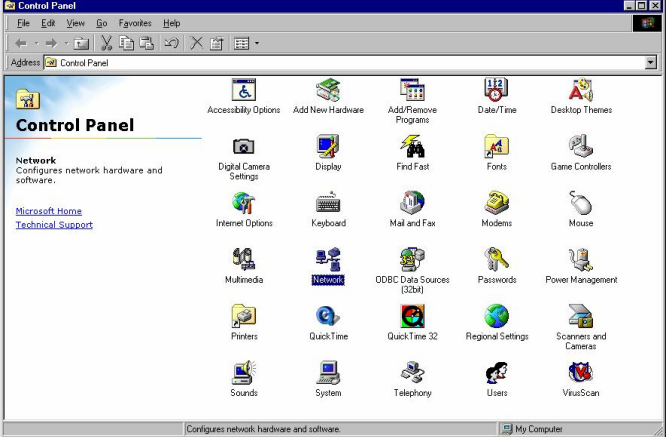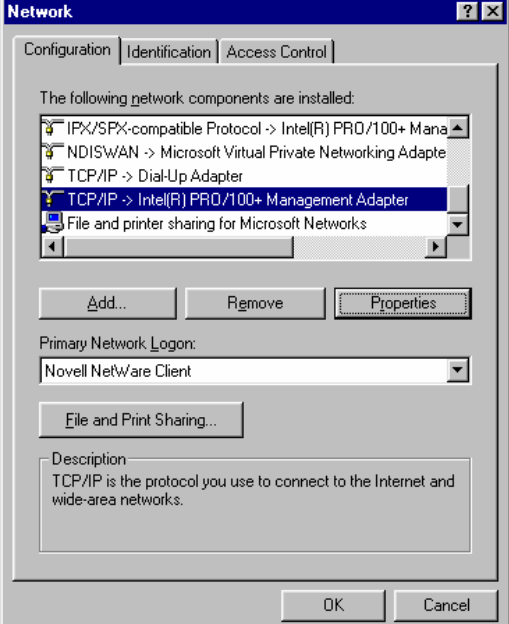
6	Click the '*Properties*' box	
7	Scroll down the This connection uses the following items list and select the '*Internet Protocol (TCP/IP)*' item	
8	Click the '*Properties*' box	
9	Select the radio button to '*Obtain an IP address automatically*'	
10	Click on '*OK*'.	
11	Close all other previously opened dialogue windows.	

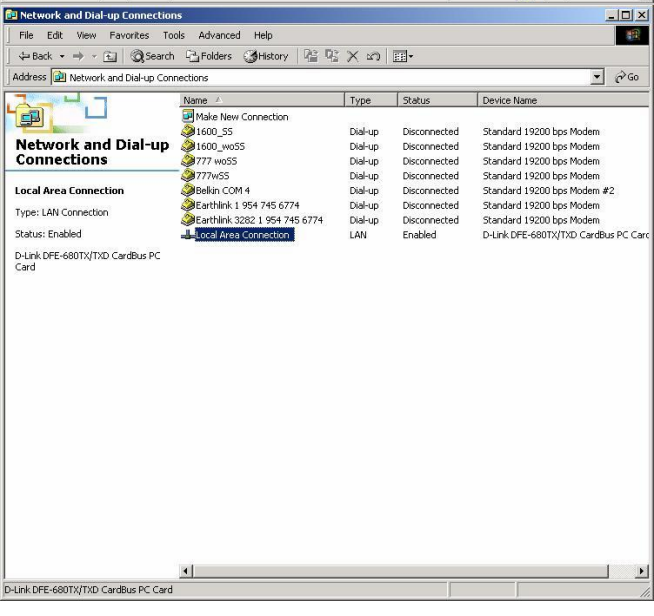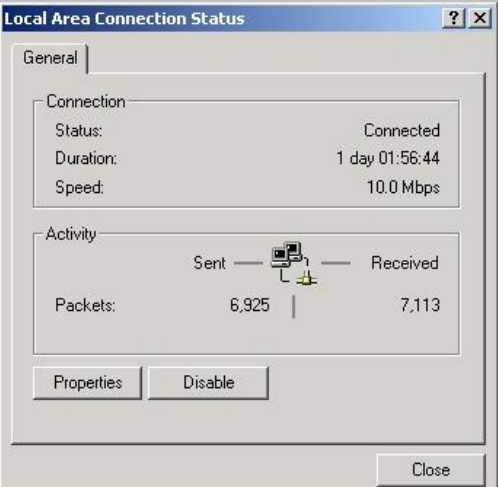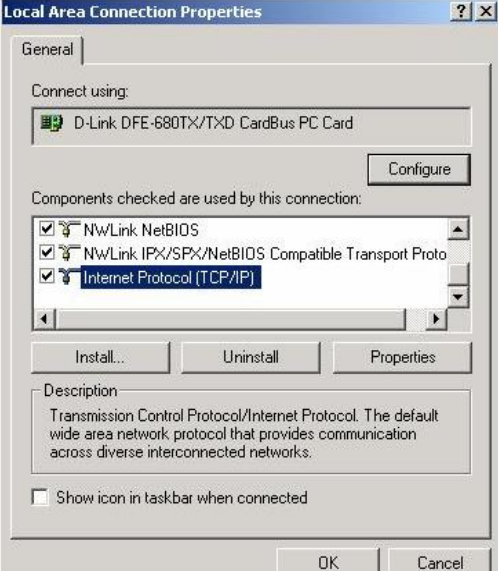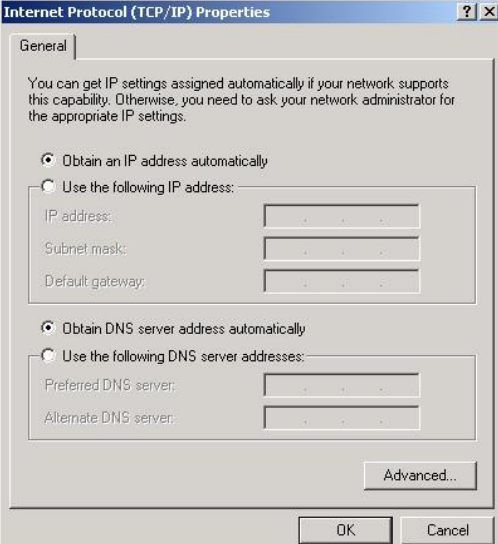### 3.8.2. To configure remote client terminals with MS Windows 2000 operating system

1 **2** **3**	Click on '*Start*' Select '*Settings*' Select '*Control panel*'	
4	Double click on the '*Network and Dial-up Connections*' icon	
5	Double click on the '*Local Area Connection*' icon	

6	Click the '*Properties*' box	
7	Scroll down the Components checked are used by this connection list and select the '*Internet Protocol (TCP/IP)*' item	
8	Click the '*Properties*' box	
9	Select the radio button to '*Obtain an IP address automatically*'	
10	Click on '*OK*'.	
11	Close all other previously opened dialogue windows.	

3.8.3. To configure remote client terminals with MS Windows 98 operating system;

1 Click on '*Start*' *2* Select '*Settings*' *3* Select '*Control panel*'	
4 Double click on the '*Network*' icon	
5 Select the '*Configuration*' tab *6* Scroll down the "The following network components are installed" list and select the '*TCP/IP*' PC Ethernet LAN card entry item *7* Click the '*Properties*' box	

8 Select the '*IP Address*' tab,

9 Select the radio button to '*Obtain an IP address automatically*'

10 Click on '*OK*'.

11 Close all other previously opened dialogue windows.
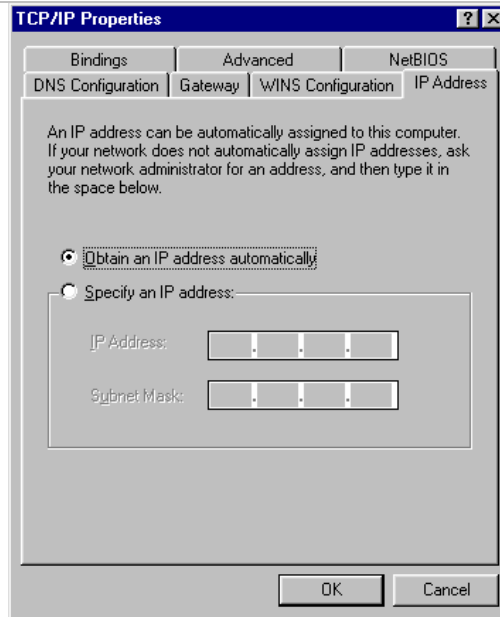
4.   Cascaded MCM-4M Set-up

1. Follow instruction above in Section 3.5 MCM-4M Installation for up to 4 MCM-4M units.
2. Install the second, third or fourth MCM-4M units in the preferred location within 12 inches of the previous MCM-4M unit. (see figure 4-1)
3. At the front panel of the MCM-4M units Install an Ethernet "Crossover" cable into the Cascade Ethernet to the subsequent unit Ethernet connector between all operational units as shown in Figures 4.1, 4.2, 4.3.
4. Set the "Thumbwheel Switch" to position 1 on the primary MCM-4M Unit.
5. Set the "Thumbwheel Switch" to position 2, 3 or 4 on the subsequent MCM-4M Units depending on how many units are cascaded.
6. Route Ethernet Cable to planned locations of remote client equipment from the Primary MCM-4M unit. The Ethernet port on the secondary MCM-4M units must be left open. **Do not connect an Ethernet cable to the secondary units while in cascade operations.**
7. Turn on power to all operational units. Primary unit will auto configure secondary units to use all modems after a short initialization time(30-45 seconds)

4.1.   Multi Channel Modem (MCM- 4M) 2 Unit Cascaded Set-up Front Panel

Figure 4-1 MCM-4M 2 Unit Cascaded Front Panel

4.2.   Multi Channel Modem (MCM- 4M) 3 Unit Cascaded Set-up Front Panel

Figure 4-2 MCM-4M 3 Unit Cascaded Front Panel

4.3.   Multi Channel Modem (MCM- 4M) 4 Unit Cascaded Set-up Front Panel
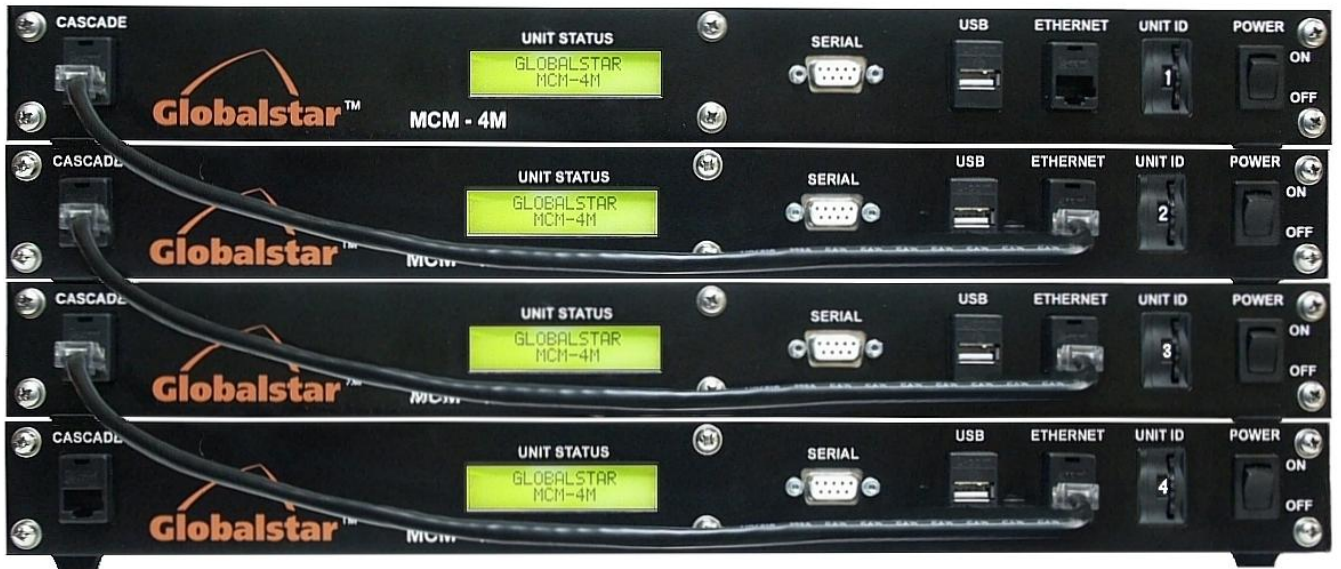
Figure 4-3 MCM-4M 4 Unit Cascaded Front Panel

5.   Troubleshooting

CAUTION *- Allow only authorized personnel to install or service the Multi Channel Modem System components.*

5.1.   General Troubleshooting

For other assistance contact your MCM-4M Technical Support Person (list below for future reference).

Name: _____ Phone _____

Problem	*Solution*	
Front Panel LCD not illuminated, MCM-4M Fans not running	*1*	Verify Power switch on MCM-4M Front Panel is set to ON.
	2	Check Power Supply connections and verify 110 VDC service is operational.

5.2.   Other Problems

This section assumes that the reader is familiar with using MS-DOS prompt PING commands (ICMP messages) to test the responsiveness of network elements any intervening connections Troubleshooting the MCM-4M.

5.2.1.   Problem:
"None of my remote client terminals are able to browse the World Wide Web".
1.   Ping (continuous) the IP address of the browser's proxy server. Stop the test after 45 seconds. If PING replies were received, then check the Browser's proxy setting and retry. If the PINGs were not replied to, then go to step 2.
2.   PING the IP address of the MCM-4M. If the PINGs were not responded to then go to step 3. If the PINGs were responded to go to step 5.
3.   Check that the Multi Channel Modem (MCM-4M) unit is being supplied with main power if ON then go to step 4. If OFF, restore main power to the MCM-4M and retest.
4.   Interact with the MCM-4M, using the HyperTerminal facility (contact your Technical Support Person). If the PINGs are not replied then go to step 5. If prompted for Username and password, then go to step 5.
5.   The problem may due to an internal failure of the MCM-4M.
6.   Contact you Technical Support person.

5.2.2.   Problem:
"I can't reach a particular VPN destination (but I can reach other VPN destinations or I can browse the World Wide Web)".
1.   Ping (continuous) the FIXED IP address of the browser's proxy server. Stop the test after 45 seconds. If PING replies were received, then the problem is likely to be somewhere at the other end of the VPN tunnel. However, whether the PINGs were replied to or not, contact your Technical Support person.

5.2.3. Problem:
"Browsing to destinations the World Wide Web is slower than usual".

     1.   Contact your Technical Support person.

6.   Specifications

6.1.   Power Specifications

Power source	115VAC
Power consumption	60 Watts maximum

6.2.   Operating Frequencies

Transmit	1610-1626.5 MHz
Receive	2483.5-2500 MHz

6.3.   Mechanical Specifications

Antenna

Height	8.83 inches
Width	4.12 inches
Length	8.87 inches
Weight	4.5 lbs

Multi Channel Modem

Height	1.75 inches
Width	17.12 inches
Depth	17.25 inches
Weight	8.0 lbs

6.4.   Environmental Specifications

Operating temperature	–30 to +60 degrees C
Storage temperature	–40 to +85 degrees C
Humidity	100% non-condensing

7.   Drawings

ANCT0601-001   MCM-4M Parts List

ITEM	QTY.	PART NO.	DESCRIPTION	REMARKS
1	1	ANCT0601-002	MULTI CHANNEL PROCESSOR CCA	
2	4	ANCT0601-003	TYPE 1620 TRANSITION CCA	
3	1	DDCT0601-004	ENCLOSURE	
4	1	DDCT0601-005	FRONT PANEL	
5	1	DDCT0601-006	REAR PANEL	
6	1	DDCT0601-007	TOP PANEL	
7	2	DDCT0601-008	MOUNTING BLOCK	
8	3	DDCT0601-009	SPACER BLOCK	
9	1	ANCT0601-010	ROUTER CCA	
10	4	GSP-1620	SATELLITE DATA MODEM	
11	1	LK162-12-E	LCD DISPLAY	
12	1	M4S-1.500W	RF COMBINER	
13	1	804-2-2.100	RF SPLITTER	
14	2	259-1181-ND	FAN, AXIAL	
15	1	WM5760-ND	TERMINAL BOARD, 3 - POSITION	
16	1	SEE REMARKS	CIRCUIT BREAKER	1410-G111-L2F1-S01-2A
17	1	PE4968	SMA FEMALE REV POL,FEEDTHRU	
18	2	ECF504B-8SK	CONNECTOR, RJ-45	
19	1	ECF504B-UAB	CONNECTOR, USB	
20	1	3-0-11-19-0-0-0	THUMBWEEL SWITCH	
21	2	400402003	SWITCH END PLATES	
22	2	402900000	SWITCH LIMIT PINS	
23	1	CKC2009-ND	POWER SWITCH	
24	1	T963-P5P-ND	12 VDC POWER SUPPLY	
25	4	ANCT0601-016-1	RF CABLE ASSEMBLY, MODEM	
26	4	ANCT0601-016-2	RF CABLE ASSEMBLY, MODEM	
27	2	ANCT0601-017	RF CABLE ASSY, COMB / SPLITTER	
28	2	ANCT0601-029	RF CABLE ASSY, ANTENNA	
29	1	ANCT0601-030	CABLE ASSY, ANTENNA POWER	
30	1	ANCT0601-018	CABLE ASSY, MCP DIGITAL I/O	
31	1	PJ-005A	DC POWER JACK	
32	1	DDCT0601-022	SERIAL NUMBER PLATE	
33	1	131 1507	CABLE ASSY, USB A TO USB B	
34	1	SEE REMARKS	CABLE ASSY, MODEM A	TCSD-10-D-11.40-01
35	1	SEE REMARKS	CABLE ASSY, MODEM B	TCSD-10-D-09.60-01
36	1	SEE REMARKS	CABLE ASSY, MODEM C	TCSD-10-D-05.40-01
37	1	SEE REMARKS	CABLE ASSY, MODEM D	TCSD-10-D-03.70-01
38	1	WM2902-ND	CONNECTOR HOUSING, 4 PIN	
39	4	WM2910-ND	CONTACTS	
40	7		RING TERMINAL (#4)	
41	1		RING TERMINAL, 0.250	
42	4		PUSH ON TERMINAL (1/8)	
43	1	5213232	CABLE ASSY, ETHERNET (1' BK)	
44	1	5213224	CABLE ASSY, ETHERNET (1' RD)	
45	1	5213161	CABLE ASSY, ETHERNET (1' YW)	
46	4	ANCT0601-31	9 PIN MODEM JUMPER	
47	1	ACH63US	USB HUB	
48	1	USM1GH	USB FLASH DRIVE, 1 GB	
49	1	131 1509	CABLE ASSY, USB (A TO MINI)	
50	1	ANCT0601-032	CABLE ASSY, BATTERY BACKUP	
51	1	P186-ND	BATTERY	
52	4	ICA91	NYLON SPACER, #4 X 0.125	

ITEM	QTY.	PART NO.	DESCRIPTION	REMARKS
101	4	SEE REMARKS	PAN HD MACH SCREW, 4-40 X 0.25	406-440-14-2A21
102	32	SEE REMARKS	PAN HD MACH SCREW, 4-40 X 0.38	406-440-38-2A21
103	4	SEE REMARKS	PAN HD MACH SCREW, 4-40 X 0.63	406-440-58-2A21
104	6	SEE REMARKS	PAN HD MACH SCREW, 4-40 X 0.75	406-440-34-2A21
105	2	SEE REMARKS	PAN HD MACH SCREW, 4-40 X 1.50	406-440-112-2A21
106	6	SEE REMARKS	PAN HD MACH SCREW, 8-32 X 0.38	406-832-38-2A21
107	12	SEE REMARKS	PAN HD MACH SCREW, 8-32 X 0.50	406-832-12-2A21
108	6	SEE REMARKS	PAN HD MACH SCREW, 10-32 X 0.31	406-1032-516-2A21
109	2	SEE REMARKS	FLAT HD MACH SCREW, 6-32 X 0.50	406-632-12-2A01
110	50	SEE REMARKS	FLAT WASHER, NO. 4	306-40-A-2 C4
111	2	SEE REMARKS	FLAT WASHER, NO. 6	306-60-A-2 C6L
112	18	SEE REMARKS	FLAT WASHER, NO. 8	306-80-A-2 C8L
113	6	SEE REMARKS	FLAT WASHER, NO. 10	306-100-A-2 C10L
114	48	SEE REMARKS	LOCK WASHER, NO. 4	350-40-A-2
115	2	SEE REMARKS	LOCK WASHER, NO. 6	350-60-A-2
116	18	SEE REMARKS	LOCK WASHER, NO. 8	360-80-A-2
117	6	SEE REMARKS	LOCK WASHER, NO. 10	360-100-A-2
118	6	SEE REMARKS	HEX NUT, 4-40	231-440-A-2
119	2	SEE REMARKS	HEX NUT, 6-32	231-632-A-2
120	2	SEE REMARKS	PAN HD MACH SCREW, 0-80 X 0.63	405-080-58-2A00
121	2	SEE REMARKS	HEX NUT, 0-80	231-080-A-2
122	1	MDVS44-ND	JACKSCREW ASSEMBLY KIT	MDVS44-ND
123	A/R	TBD	DOUBLE SIDED TAPE	
124	A/R	SEE REMARKS	WIRE, 22 AWG - WHITE	2845/19 WH005
125	A/R	SEE REMARKS	WIRE, 22 AWG - BLACK	2845/19 BK005
126	A/R	SEE REMARKS	WIRE, 22 AWG - RED	2845/19 RD005
127	A/R	SEE REMARKS	WIRE, 22 AWG - ORANGE	2845/19 OR005
128	A/R	TBD	SHRINK SLEEVE, 1/8 IN	
129	A/R	TBD	WIRE TIES	
130	A/R	TBD	HOLD DOWN, WIRE TIES	

ANCT0601-001   MCM-4M Front and Rear Panel

NOTE – APPLY SERIAL NUMBER PLATE AFTER
INSTALLATION OF TERMINAL BOARD

	DRAWN	M. COX	SIZE C	FSCM NO 3QXZ5	DWG NO ANCT0601-001	REV -
	ISSUED		SCALE 1 : 1		SHEET 2 OF 8	
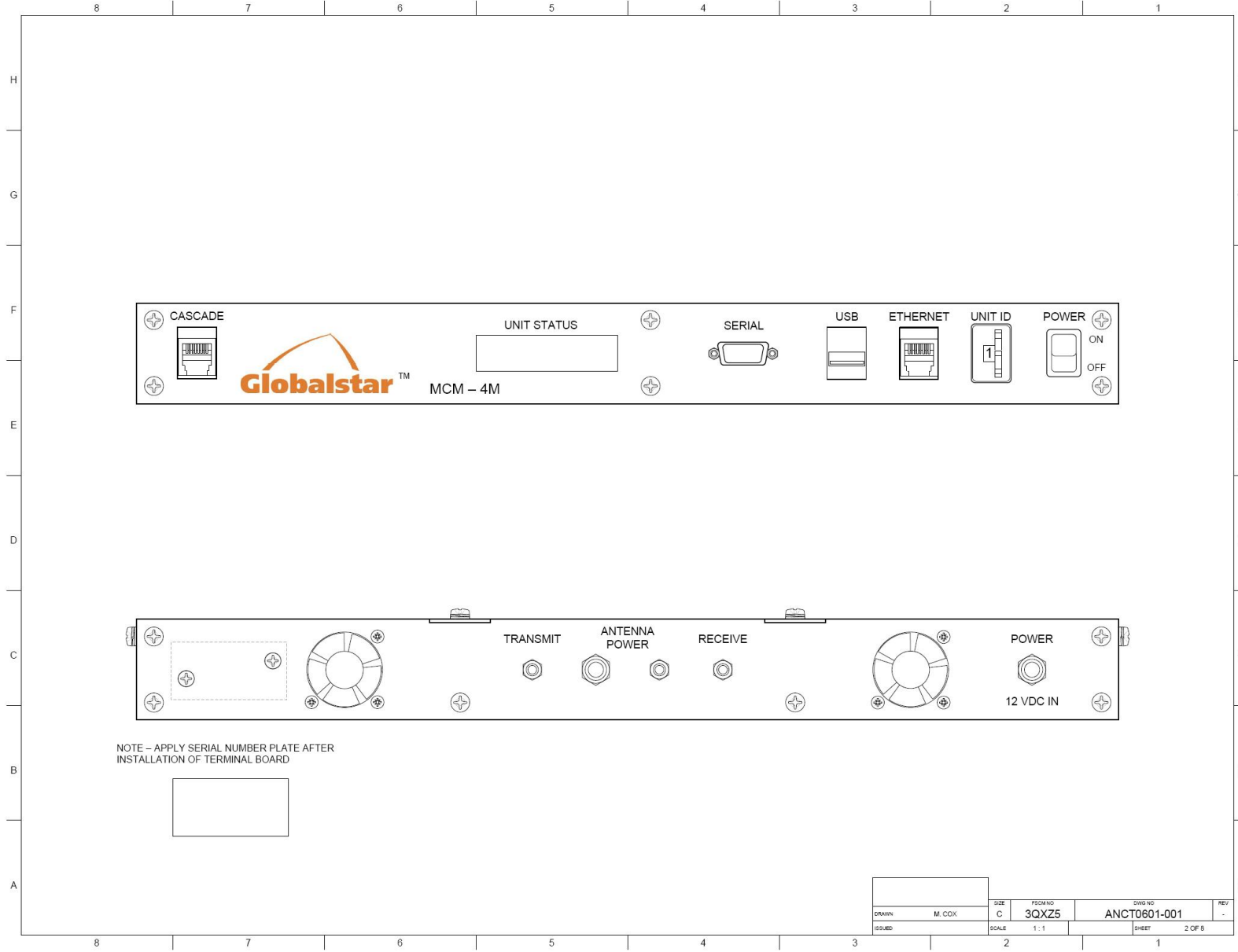
ANCT0601-001   MCM-4M Top and Side View
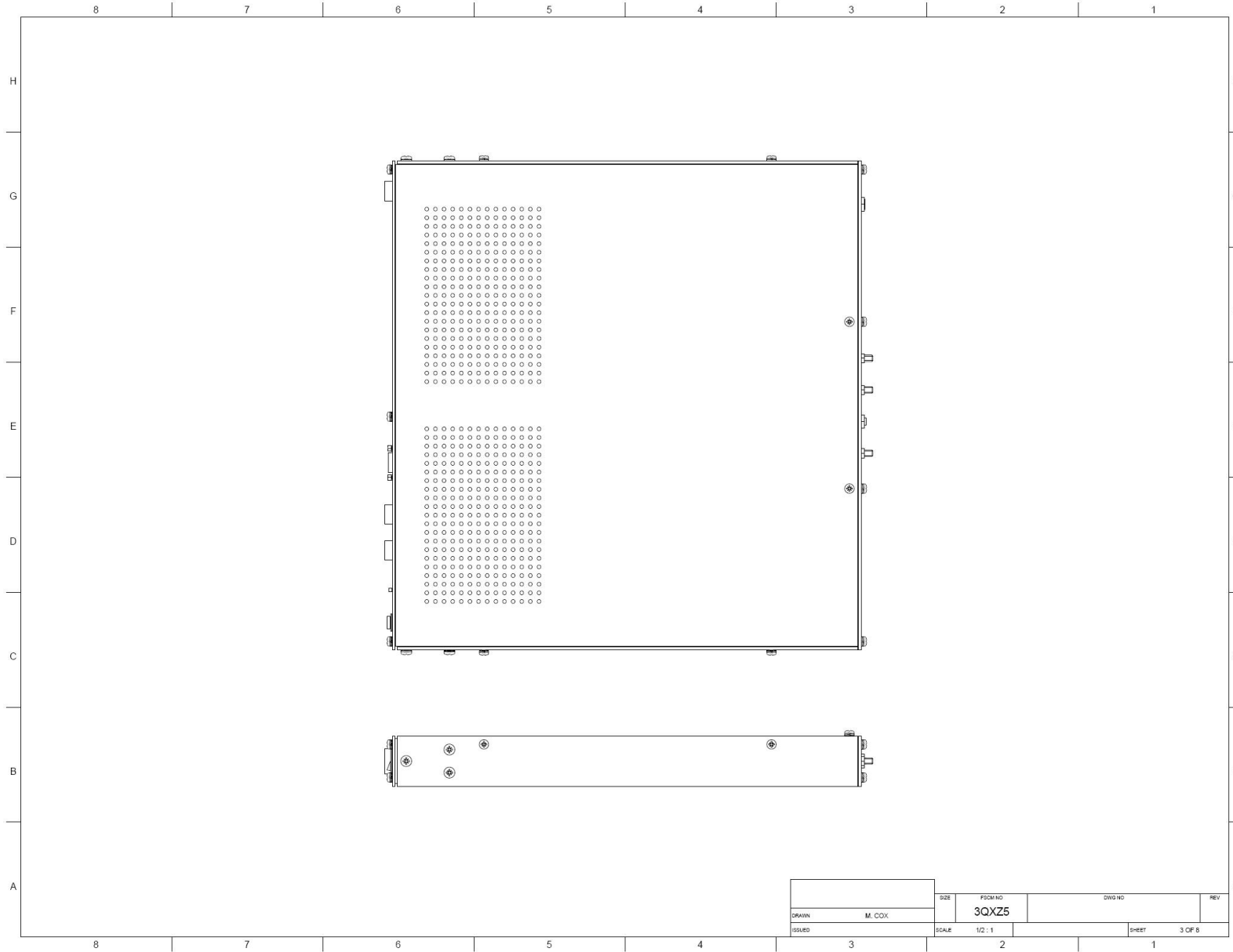
SIZE	FSCM NO	REV
DRAWN	M. COX	3QXZ5
ISSUED	SCALE 1/2 : 1	SHEET 3 OF 8

ANCT0601-001   MCM-4M Top View Cover Removed

TOP VIEW

VIEW D - D

| DRAWN | M. COX | SIZE C | FSCM NO 3QXZ5 | DWG NO ANCT0601-001 | REV - |
| ISSUED | | SCALE 1/2 : 1 | | SHEET 4 OF 8 | |
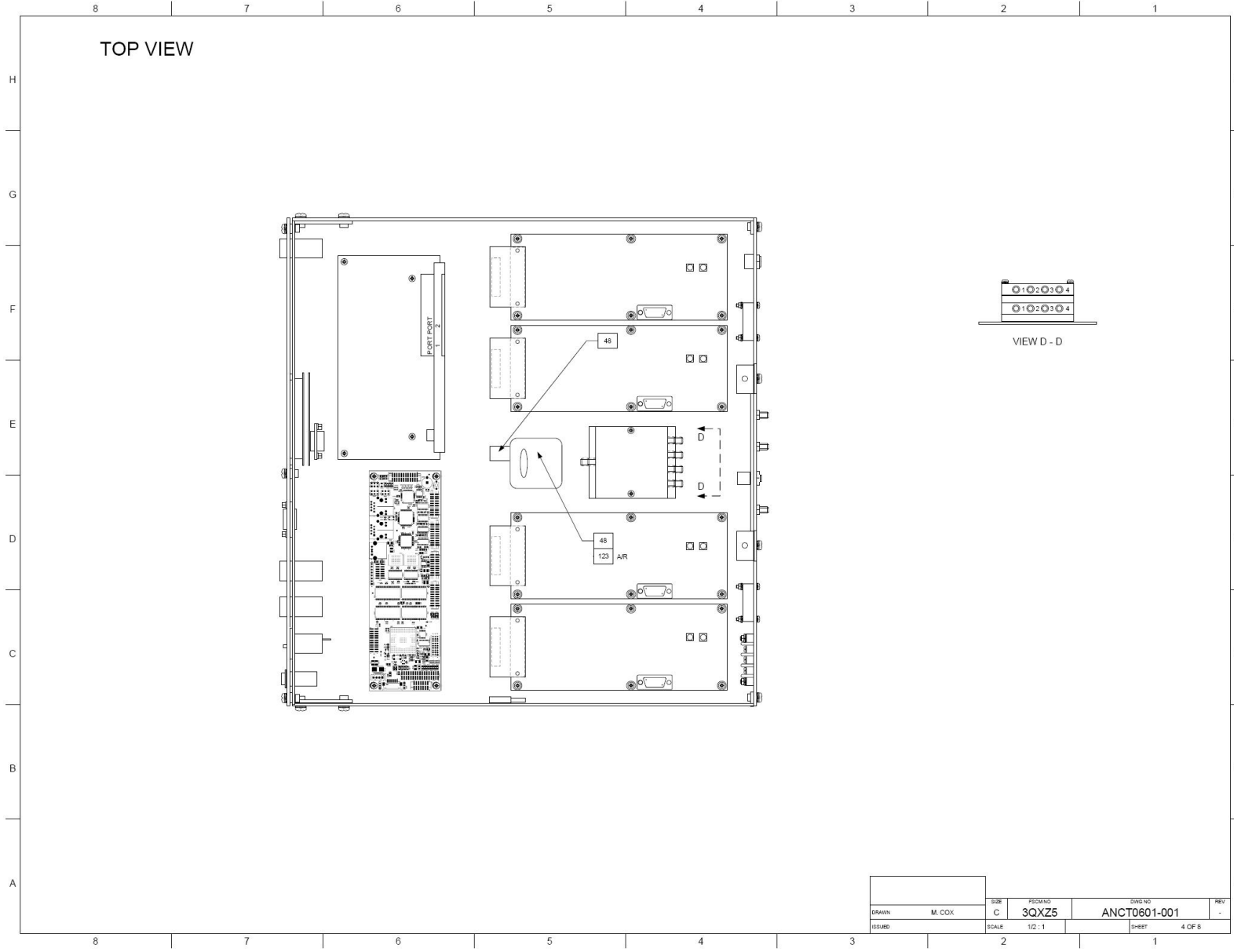
ANCT0601-001   MCM-4M Cable DWG – Modem Data/Cntl Ports to MCP CCA

CABLE DIAGRAM - DATA

ETHERNET — RJ-45 JACK (ITEM18) — CABLE ASSEMBLY, ETHERNET - BLACK (ITEM 43) — PORT 1 / PORT 2 — ROUTER CCA (ITEM 9)

CABLE ASSEMBLY, ETHERNET - YELLOW (ITEM 45)

CASCADE — RJ-45 JACK (ITEM18) — J300

CABLE ASSEMBLY, ETHERNET - RED (ITEM 44) — J310

UNIT STATUS — LCD DISPLAY (ITEM 11)

BATTERY BACKUP (ITEMS 50,51) — J2515

SERIAL — CONNECTOR, 9 PIN D FEMALE (P/O ITEM 30)

CABLE ASSEMBLY, MCP DIGITAL I/O (ITEM 30)

UNIT ID — THUMBWHEEL SWITCH 4 POSITION (ITEM 20) — J340

MULTI CHANNEL PROCESSOR CCA (ITEM 1)

J800

CABLE ASSEMBLY, USB (A TO MINI) (ITEM 49)

USB — USB JACK (ITEM19) — CABLE ASSEMBLY, USB (A TO B) (ITEM 33) — USB HUB (ITEM 47) — USB FLASH DRIVE (ITEM 48)

J1510 — CABLE ASSEMBLY, MODEM A (ITEM 34) — MODEM TRANSITION CCA (ITEM 2) — MODEM ASSEMBLY (ITEM 10)

J1520 — CABLE ASSEMBLY, MODEM B (ITEM 35) — MODEM TRANSITION CCA (ITEM 2) — MODEM ASSEMBLY (ITEM 10)

J1410 — CABLE ASSEMBLY, MODEM C (ITEM 36) — MODEM TRANSITION CCA (ITEM 2) — MODEM ASSEMBLY (ITEM 10)

J1420 — CABLE ASSEMBLY, MODEM D (ITEM 37) — MODEM TRANSITION CCA (ITEM 2) — MODEM ASSEMBLY (ITEM 10)

| DRAWN | M. COX | SIZE C | FSCM NO 3QXZ5 | DWG NO ANCT0601-001 | REV - |
| ISSUED | | SCALE 1/2 : 1 | | SHEET 6 OF 8 | |

ANCT0601-001   MCM-4M RF Cable Diagram

RF CABLE DIAGRAM

DRAWN	M. COX	SIZE C	FSCM NO 3QXZ5	DWG NO ANCT0601-001	REV -
ISSUED		SCALE 1/2 : 1		SHEET 7 OF 8	
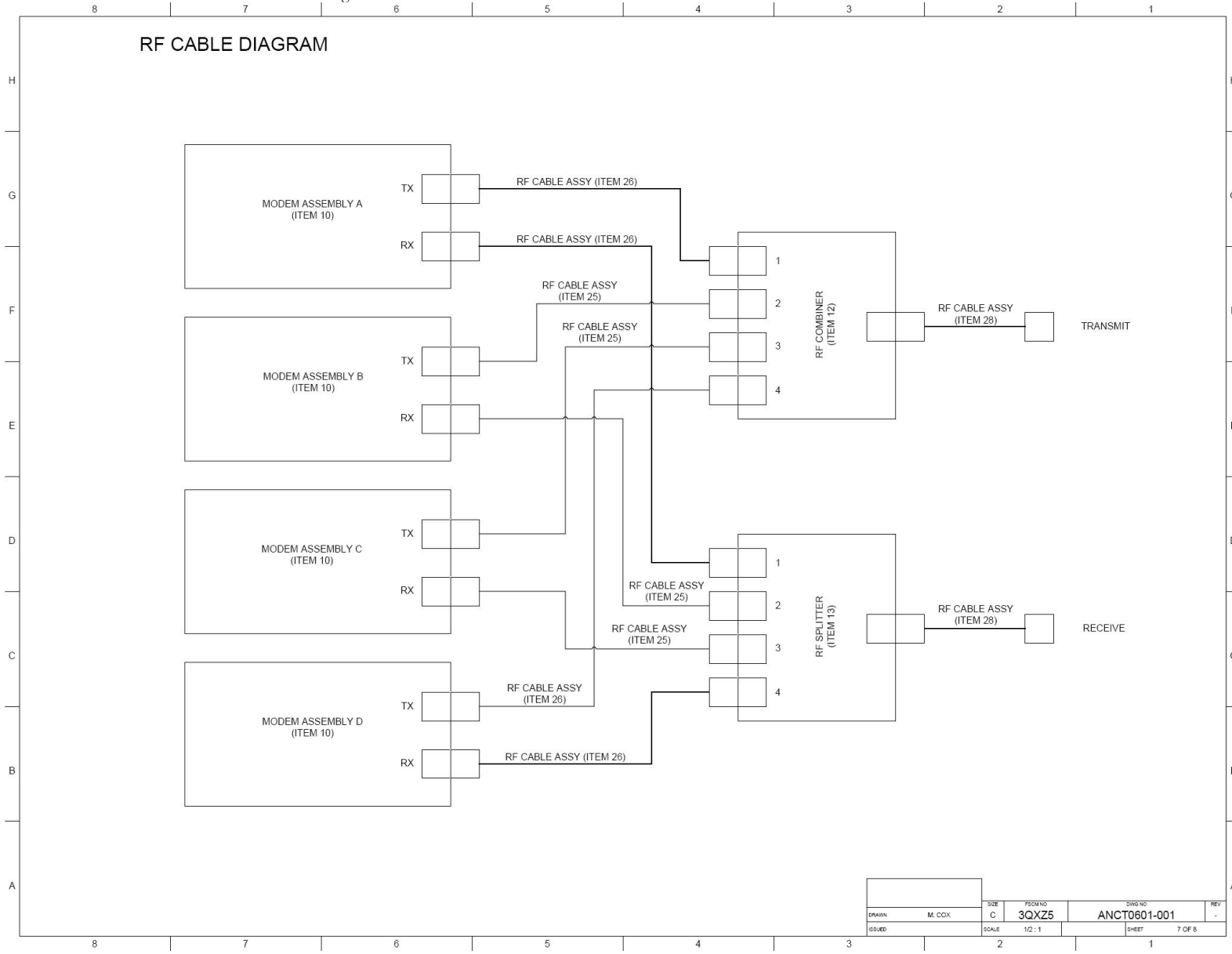
ANCT0601-001   MCM-4M Chassis and Power Supply Wiring Diagram

CHASSIS AND POWER SUPPLY WIRING

MULTI CHANNEL
PROCESSOR CCA
(ITEM 1)

ROUTER CCA
(ITEM 9)

FAN
(ITEM 14)

FAN
(ITEM 14)

J2400

| 1 | 2 | 3 | 4 |

TIP   RING

TIP   RING

ANTENNA POWER

CIRCUIT BREAKER
(ITEM 16)

CENTER

SHIELD

ANTENNA POWER CABLE ASSY
(ITEM 29)

SWITCH
(ITEM 23)

TERMINAL BOARD
(ITEM 15)

A   B

1

2

3

TIP

DC INPUT

RING

12 VDC POWER SUPPLY
(ITEM 24)

| DRAWN | M. COX | SIZE C | FSCM NO 3QXZ5 | DWG NO ANCT0601-001 | REV - |
| ISSUED | | SCALE 1/2 : 1 | | SHEET 8 OF 8 | |
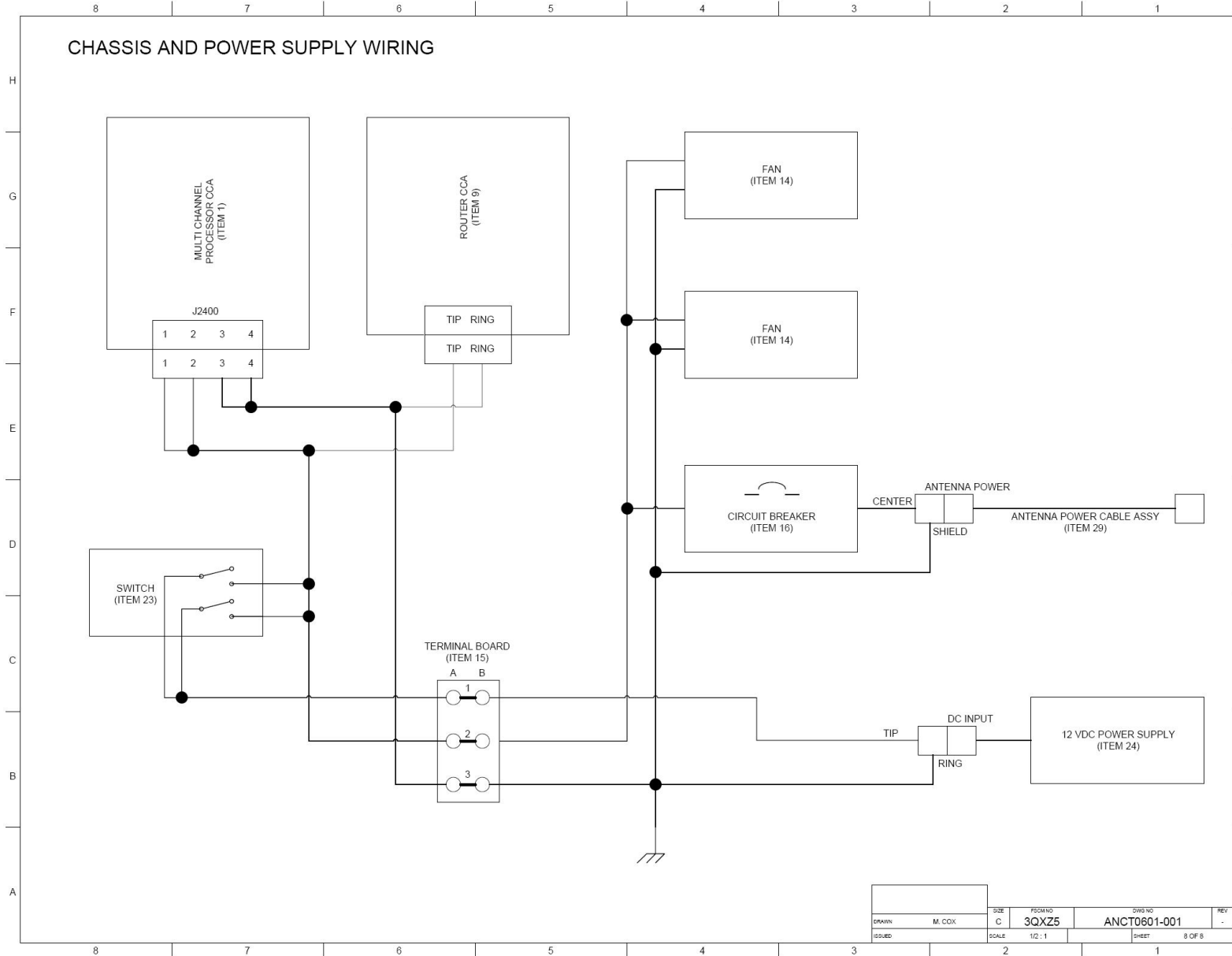
ANCT0601-029   MCM-4M External RF Cable Drawing

ITEM	QTY.	PART NO.	DESCRIPTION
1	2		PLUG, SMA MALE
2	A/R		COAXIAL CABLE, LMR-195

		REVISIONS		
ZONE	REV	DESCRIPTION	DATE	APPROVED
		PRE-RELEASE	3/13/06	

360 ± .5

"USE OR DISCLOSURE OF DATA CONTAINED ON THIS SHEET IS SUBJECT
TO THE RESTRICTION ON THE TITLE PAGE OF THIS DOCUMENT."

DIMENSIONS IN INCHES
TOLERANCES UNLESS OTHERWISE
SPECIFIED
2 PLC DEC ± 0.020
3 PLC DEC ± 0.005
4 PLC DEC ± 0.001

CORNERTURN LLC

RF CABLE ASSEMBLY, ANTENNA

DRAWN BY	SIZE	FSCM NO	DWG NO	REV
M. COX	B	3QXZ5	ANCT0601-029	-

FILENAME

| SCALE | | SHEET | 1 OF 1 |

ANCT0601-030   MCM-4M Antenna Power Cable Drawing

ITEM	QTY.	PART NO.	DESCRIPTION
1	2		PLUG, REVERSE POLARITY SMA MALE
2	A/R		COAXIAL CABLE, LMR-200

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
		PRE-RELEASE	3/13/06	

360 ± .5

"USE OR DISCLOSURE OF DATA CONTAINED ON THIS SHEET IS SUBJECT
TO THE RESTRICTION ON THE TITLE PAGE OF THIS DOCUMENT."

DIMENSIONS IN INCHES
TOLERANCES UNLESS OTHERWISE
SPECIFIED
2 PLC DEC ± 0.020
3 PLC DEC ± 0.005
4 PLC DEC ± 0.001

CORNERTURN LLC

CABLE ASSEMBLY, ANTENNA POWER

DRAWN BY	SIZE	FSCM NO	DWG NO	REV
M. COX	B	3QXZ5	ANCT0601-030	-
FILENAME				
SCALE			SHEET	1 OF 1