



.....
I N C L U D E D I N S I D E :

- *Features*
- *Application Information*
- *AxxSys™ Earth Station Management System*
- *Specifications*



GLOBECOMM SYSTEMS INC.

.....
T e l e c o m m u n i c a t i o n s S o l u t i o n s F o r T h e G l o b a l C o m m u n i t y

Globecomm Systems provides unparalleled Application Engineering support to its customers.

GENERAL DESCRIPTION

The Commercial Terminal Family (CTF 2001) offers flexibility within the context of a wide set of options available with the standard design. This terminal product line provides antenna sizes from 1.2 meters to 9.3 meters, with High-Power Amplifiers (HPA) from 16 Watts to 400 Watts in C-band, and 300 Watts in Ku-band. Non-redundant and redundant transceiver designs minimize space requirements and cost. The industry standard 70 MHz Intermediate Frequency interface provides flexibility in choice of baseband modulation equipment. Both SCPC and TDMA baseband equipment options are available. Other options, such as uplink power control, deicing, tracking, test translator, and AxxSys™ Earth Station Management Systems are available as part of the standard product line.

FEATURES

Antennas are Intelsat/Panamsat/Asiasat/Eutelsat/Orion/FCC compliant.

- G/T available from 19 to 31 dB/K at C-band
- G/T available from 19 to 37 dB/K at Ku-band
- EIRP available from 53 to 76 dBw at C-band
- EIRP available from 54 to 76 dBw at Ku-band
- Transceiver design supports independent receive/transmit tuning
- RS485 Serial bus for earth station management
- Test Loop Translation (option)
- Ease of use through Advanced AxxSys™ Earth Station Management System
- Supports 9.6 KB to 2.048 Mbps links
- Uplink power control for Ku-band has beacon and loopback modes
- Non-redundant/redundant options
- Reliability through environmental stress screening of critical components
- Redundancy switching – less than 500 msec
- Lightning protection – all interfaces

APPLICATION INFORMATION

The Globecomm Systems Commercial Terminal Family (CTF 2001) is designed to provide reliable service in the most demanding applications of satellite communications data and voice networks. These terminals fall into the following general categories:

- SCPC voice/data network nodes
- TDMA voice/data network nodes
- VSAT hub terminals
- Digital video uplink terminals
- Intelsat IBS/IDR service
- Eutelsat SMS service

The baseline antennas are provided with manually positioned mounts. Options for Jog Control, and Advanced Step Track Antenna Control Units are available. The Advanced Step Track Control system tracks satellites with up to 10 degrees inclination.

The following table provides application guidance for selecting a class of Intelsat transmit terminal, based on the receive terminal at the far end of the link. The capacity is specified in terms of an equivalent number of 64 Kbps circuits for the TWTA option.

Capacity Based on Intelsat Receive Station Class

Intelsat Transmit Earth Station	Std F1	Std F2	Std F3	Std B	Std A
Std E1 (2.4 m)	15	30	50	100	150
Std E2 (4.6 m)	40	100	150	350	450
Std E3 (7.3 m)	100	200	300	700	900
Std F1 (3.7 m)	5	10	15	30	40
Std F2 (6.1 m)	10	20	30	60	80
Std F3 (7.3 m)	20	40	60	100	150

UP FRONT ENGINEERING

Globecomm Systems believes in simulation of link performance up front, in order to ensure that the station will meet or exceed all requirements. An example of the output that results from our simulations is presented on page 6. We provide application engineering services to our customers to assure that the selected earth terminal is optimum for the specific customer requirements and satellite system.

EASE OF USE

Globecomm Systems applies the latest information technology to reduce the operating complexity and cost of Gateway Earth stations. Features include x-windows or Microsoft NT windows graphical user interface for ease of operator interaction with the system, and relational data base management system options for integration of maintenance and operations functions. Our AxxSys™ Earth Station Management System provides the ultimate in configurability by the user, based on software models of the earth station devices. This approach allows new systems to be generated quickly and cost effectively and allows upgrades to be handled without software development. Integration of maintenance and operations functions allows the user to minimize paperwork, manual processing of data, and consequently, the manpower required to operate a major gateway facility.

AXXSYS™ EARTH STATION MANAGEMENT SYSTEM

The AxxSys™ Earth Station Management System consists of a computer workstation which interfaces with the RF equipment (and other system related hardware). The system constantly monitors the RF equipment for faults and, where applicable, provides the ability to control these items through their remote interfaces. The workstation can also be connected to another workstation which acts as an interface to a remote operator.

A key feature of the Globecomm Systems AxxSys™ Earth Station Management System is the ability to remotely log into the system to update software, or to perform software maintenance. This means our customers can obtain the latest version of software, or request software maintenance, without a Globecomm Systems representative on site, thereby saving time and money for everyone.

The workstation acts as a command console which enables constant monitoring, remote operator control, event logging, and system configuration. It is provided with a high-resolution color graphics monitor for displaying equipment status, as well as a printer for making hard copy of activity logs and reports. The software permits different security levels of operator interaction with the equipment. Monitor and Control of the Gateway Earth Station is possible from a remote location, using a second workstation connected to the local earth station control center computer.

The monitoring functions associated with the AxxSys™ Earth Station Management System include uplink/downlink frequency, HPA forward power, operational condition (online/standby), readiness condition (normal/alarm), and other system status indications for all uplink/downlink equipment. Control functions include HPA beam on/off, uplink/downlink frequency, and selection of online uplink/downlink equipment.

Earth station management software options include Operations Level and Enterprise Level.

The Operations Level includes a Training Mode, automatically generated Trouble Reports, Outage Reports, Equipment History Logs, Equipment Inventory Reports, etc. The Enterprise Level

integrates business functions like scheduling of traffic feeds, billing, payroll, accounting, etc. These options allow the earth station operator to reduce the cost of Operations and Maintenance by leveraging the capability of modern Relational Data Base Management System technology. This technology allows functions which previously required manual labor to be consolidated and automated.

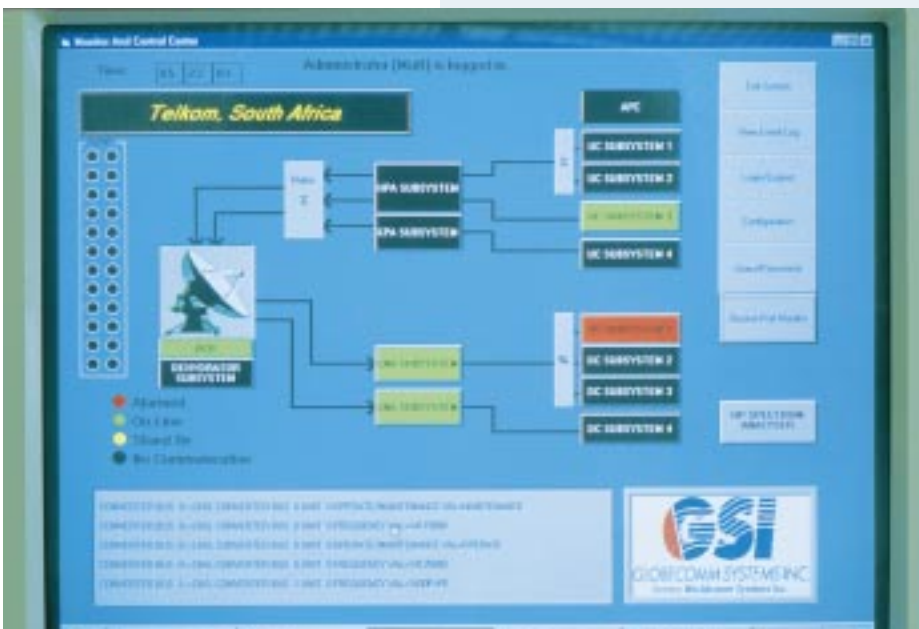
Environmental Specifications

Outdoor Temperature	-40°C to +50°C
Outdoor Humidity	to 100%
Indoor Humidity	50 to 95%
Altitude	10,000 ft. operating

AC Power Requirements (Redundant System)

HPA Power Level	AC Power
5 W	350 VA
10 W	400 VA
20 W	625 VA
300 W	4700 VA
400 W	4700 VA

Advanced AxxSys™ Earth Station Management System reduces costs and expands digital transmission services.



UPLINK SYSTEM

The uplink system consists of an up converter, a High-Power Amplifier (HPA) subsystem, and an optional uplink power control subsystem. The uplink subsystem is supplied in either non-redundant or redundant configuration. The IF input level to the uplink is adjustable in 0.125 dB steps over a 20 dB range. The 1:1 redundancy implementation allows for automatic replacement of a single failed uplink. Each uplink is a synthesized dual conversion unit capable of automatically tuning to a locally or remotely selected frequency. The RF output of each uplink is monitored through a coupler.

The HPA subsystem is comprised of either a Solid-state or TWT High-Power Amplifier, with power output determined by the EIRP option selected on order. The online HPA feeds a waveguide transmission line which is connected to the antenna OMT. The output of the standby HPA is connected to a dummy load. The Indoor Unit provides interfaces to the optional Uplink Power Control Unit, optional AxxSys™ Earth Station Management System, and optional satellite modem subsystems.

CTF 2001 EIRP Specifications

Terminal Type	Antenna Diameter	Transmit Gain	Baseline		Options-SSPA		TWTA	
			HPA Power	EIRP	HPA Power	EIRP	HPA Power	EIRP
			Watts	dBW	Watts	dBW	Watts	dBW
	Meter	dB						
G	1.8	46.7	16	57.7	25	59.7	300	69.5
E1	2.4	49.2	16	60.2	25	62.2	300	72.0
E1	3.7	52.9	16	63.9	25	65.9	300	75.7
E2	4.6	55.1	16	65.1	25	67.1	300	77.9
E2	6.1	57.1	16	67.1	25	69.1	300	79.9
E3	7.3	58.5	16	68.5	25	70.5	300	80.3
E3	9.3	60.8	16	70.8	25	72.8	300	81.6
G	1.8	39.3	25	52.8	35	54.2	400	64.3
F1	2.4	41.8	25	55.3	35	56.7	400	66.8
F1	3.7	45.9	25	58.9	35	60.3	400	70.9
F1	4.6	47.1	25	60.1	35	61.5	400	72.1
F2	6.1	49.4	25	62.4	35	63.8	400	74.4
F3	7.3	51.4	25	64.9	35	65.8	400	75.9
B	9.3	53.6	25	66.6	35	67.5	400	78.1

Notes: Gain @ mid band.

EIRP @ maximum output for TWT; 1 dB compression for SSPA.

Uplink Subsystem Specifications

RF Frequency	5.850-6.425 GHz (1 MHz steps) or 14.0-14.5 GHz (5 MHz steps)
IF Frequency	52 to 88 MHz
Amplitude Response (IDR)	0.5 dB p-p (0.6R)*
Group Delay (IDR)	10 nsec. p-p (0.6R)*
Input Level	-5 to -25 dBm, nominal
Transmit Gain Adjustment Range	0 to 20 dB, 0.125 dB steps
Level Stability	±1.5 dB (over temp.)
Intermodulation Products	-24 dBc (two carriers, 7 dB backoff)
Harmonic Suppression	-60 dBc
Spurious Output Carrier Related	-50 dBc at saturation
IF Input Impedance	50 to 75 ohms, unbalanced
IF Input VSWR	1.5:1
Frequency Stability (Constant Temp.)	±1 x 10 ⁻⁹ /day
Spectral Purity	Phase Noise (1 Hz, SSB)
Frequency Offset	
100 Hz	-60 dBc
1 kHz	-70 dBc
10 kHz	-75 dBc
100 kHz	-80 dBc
1 MHz	-80 dBc
MTBF	20,000 hours or greater

*R = Transmission Rate in bits per second,
Specification based on Intelsat IESS 308/309

DOWNLINK SYSTEM

The downlink system consists of the Low-Noise Amplifier (LNA) and down converter subsystems. The RF signals from the receive port of the antenna OMT are fed through a Transmit Reject Filter (TRF) to the Low-Noise Amplifier whose outputs are connected to the down converter subsystem.

The LNA is a GaAs FET amplifier with a noise temperature consistent with the G/T for the antenna/frequency band selected at order. The redundant LNA subsystem (option) is mounted on a plate with a transmit reject filter and input waveguide switches. The plate is mechanically mounted inside the antenna hub so it rotates with feed polarization adjustment for linear polarization configurations, and is fixed for circular polarization configurations.

The downlink subsystem is supplied in a non-redundant or redundant configuration. The IF output of each downlink is available for signal monitoring. The IF output level of each down converter is adjustable in 0.125 dB steps over a 20 dB range. 1:1 redundancy implementation allows for automatic replacement of a failed downlink. Each downlink is a synthesized dual conversion unit capable of automatically tuning in 1 MHz steps to a locally or remotely selected frequency.

CTF 2001 G/T Specifications

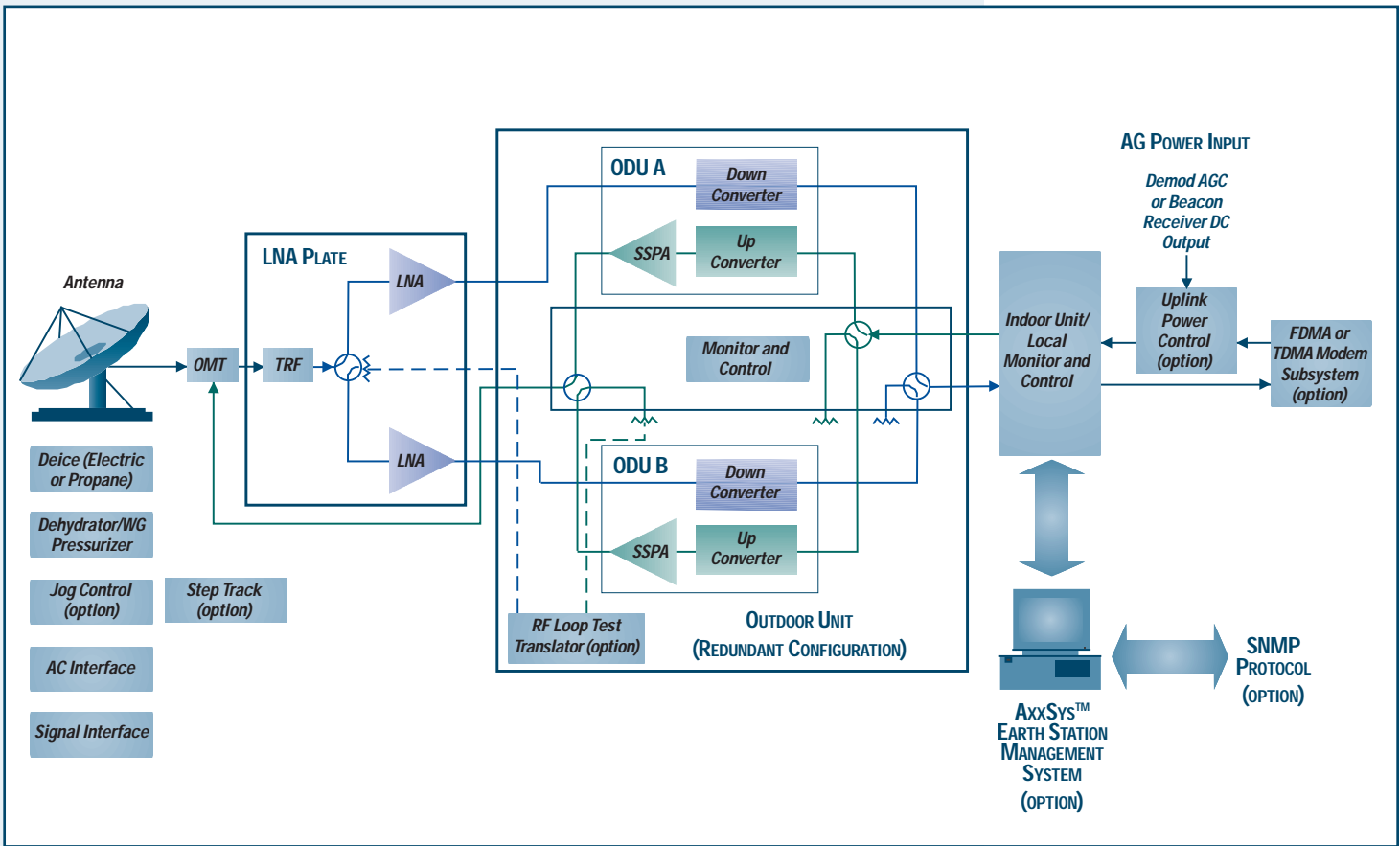
Terminal Type	Antenna Diameter	Receive Gain	LNA Temp	System G/T
	Meter	dB	K	dB/K
G	1.8	45.3	90	23.1
E1	2.4	47.8	90	25.2
E1	3.7	51.1	90	28.5
E2	4.6	53.6	90	31.0
E2	6.1	55.8	90	33.2
E3	7.3	57.2	90	34.6
E3	9.3	59.5	90	36.9
G	2.4	35.8	40	17.0
F1	3.7	42.4	40	23.5
F1	4.6	43.8	40	24.9
F2	6.1	46.6	38	28.0
F3	7.3	48.5	40	29.6
B	9.3	50.5	35	31.9

Notes: Specified @ 50 C, 10 degrees elevation angle.

Downlink Subsystem Specifications

RF Frequency (1 MHz steps)	3.625 - 4.2 GHz or 10.95 - 11.7 GHz
IF Frequency	52 to 88 MHz
Amplitude Response (IDR)	0.5 dB p-p (0.6R)*
Group Delay (IDR)	10 nsec. p-p (0.6R)*
Downlink Gain	80 dB, nominal
IF Level Gain Adjustment Range	0 to 20 dB, 0.125 dB steps
Level Stability	±0.5 dB (over Temp.)
Spurious Output Carrier Related	-50 dBc
IF Input Impedance	50 to 75 ohms, unbalanced
IF Input VSWR	1.5:1
Frequency Stability (Constant Temp.)	±1 x 10 ⁻⁹ /day
Spectral Purity	
Frequency Offset	Phase Noise (1 Hz, SSB)
100 Hz	-60 dBc
1 kHz	-70 dBc
10 kHz	-75 dBc
100 kHz	-80 dBc
1 MHz	-80 dBc
MTBF	30,000 hours or greater

*R = Transmission Rate in bits per second
Specification based on Intelsat IESS 308/309.



Globecomm Systems will work with you to configure a totally integrated system to meet your specific needs with the following options:

<i>Item</i>	<i>Options</i>
Antenna Size	1.8 Meter
	2.4 Meter
	3.7 Meter
	4.6 Meter
	6.1 Meter
	7.3 Meter
	9.3 Meter
High Power Amplifier	16 Watts TWT Ku-band
	20 Watts TWT C-band
	25 Watts TWT Ku-band
	35 Watts TWT C-band
	100 Watts TWT Ku-band
	170 Watts TWT C-band
	300 Watts TWT Ku-band
400 Watts TWT C-band	
Redundancy	1:1 Transceiver/ LNA Redundancy
Tracking	Jog Control Step Track with: Manual Mode Memory Track Step Track (for satellites inclined up to 10 degrees)
Deice	Electric Propane
Uplink Power Control (Rain Fade Compensation)	Beacon Mode Demodulator AGC Mode (loopback)
Loopback Testing	RF Loop Test Translator
AxxSys™ Earth Station Management System	SNMP Interface Operations Level (Reporting) Enterprise Level (Administration)

.....
*Leading-edge telecommunications systems...mission critical networks...
high-quality, competitively priced satellite earth stations...out-of-this-world
engineering, down-to-earth service...and exceptional value in everything that bears
our name. That's Globecom Systems, the place where superb engineering
intersects advanced information management technology to provide you with
maximum productivity.*

*From requirements definition and simulation of solutions, through custom installation
of hardware and software, Globecom Systems is a powerful ally when it comes to
leveraging communications/satellite systems to your fullest advantage.*

.....
GLOBECOMM SYSTEMS CAPABILITIES INCLUDE:

- *Traffic Analysis*
- *Network Analysis, Design and Implementation*
- *Earth Station Analysis, Design and Installation*
- *Earth Station Products*
- *Network Management Systems*
- *Training and Customer Support*
- *Operations and Maintenance*

.....
GLOBECOMM SYSTEMS EQUIPMENT AND SERVICES INCLUDE:

- *Intelsat Standard A Gateways*
- *Modular Building Block Gateways*
- *Digital Satellite Communications Terminals*
- *Commercial Terminal Family*
- *Military and Commercial Portable Communications Systems*
- *System Engineering and Application*
- *Network Monitor and Control*
- *Hub Earth Stations*



GLOBECOMM SYSTEMS INC.

.....
Telecommunications Solutions For The Global Community

*Globecom Systems Inc.
45 Oser Avenue
Hauppauge, NY 11788-3816
USA
TEL: +1 516 231-9800
FAX: +1 516 231-1557
<http://www.globecommsystems.com>
e-mail: info@globecommsystems.com*