

**L MULTIPLEX TERMINALS  
COMMON EQUIPMENT  
CARRIER TRANSMISSION MAINTENANCE SYSTEM (CTMS)  
DEMAND MEASUREMENT PROGRAMS**

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**1. GENERAL**

**1.01** This section provides instructions for making CTMS demand measurements via the system teleprinter, via DATA-PHONE® service, or via the remote control and display (RC&D) system. Demand measurement programs are intended for direct use by the operator to make single measurements or a short series of related measurements to fulfill an immediate requirement.

**1.02** This section is reissued to describe revised DMAN program parameter structure, add DIAL program information, and make numerous changes or corrections. Since this reissue constitutes a general revision, arrows ordinarily used to indicate changes are omitted.

**1.03** Figure 1 illustrates the points in an office at which measurements can be made. The types of measurements include:

- pilot deviation from nominal

**2. TELEPRINTER DEMAND MEASUREMENTS**

**2.01** A command to the teleprinter demand measurement program DMAN may be initiated at any time, even though another program may be running and printing output. The space bar is pressed to gain the attention of the system. When an asterisk is printed, the command to start the measurement should be given as:

\*ON,DMAN[*p1*]

**Where:**

*p1* = 0 (or absent) make a single measurement.

*p1* > 0 number passed indicates number of times in succession that an identical measurement is to be made and result printed.

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The DMAN program acknowledges the command by printing:

DEMAND TEST *date time*  
INPUT:

**2.02** The operator should then input required information in this form:

For all measurements except type 10:

*u,t,a,f [,sg [,gr [,chan ]]]*

For type 10 (any frequency) measurements:

*u,t,a,f,kHz [,Hz]*

**Where:**

*u* is the assigned **user** (operator) identification number for RC&D program. Enter a zero for DMAN use since user numbers are not recognized by the DMAN program.

*t* is a number to indicate the **type** of measurement to be made as follows:

- 1—pilot deviation in dB from nominal
- 2—channel power deviation in dB from nominal spread of 20 dB
- 3—channel power in dBm0 (wideband filter)
- 4—channel noise in dBrc0 adjusted for group pilot deviation
- 5—supergroup out-of-band noise in dBrc0 adjusted for supergroup pilot deviation
- 6—1000-Hz tone in dBm0 (narrowband filter)
- 7—2600-Hz tone deviation in dB adjusted for group pilot deviation (narrowband filter)
- 8—1000-Hz tone in dBm0 adjusted for group pilot deviation (narrowband filter)
- 10—any frequency in dBm0 (narrowband filter).

*a* is a number to indicate the measurement **access** point as follows:

- 2—receiving line access

- 3—transmitting line access
- 4—receiving mastergroup access
- 5—transmitting mastergroup access
- 6—scanner supergroup output access
- 8—scanner group output access
- 10—group pilot secondary distribution bus access.

*f* is the **facility** identification (line and mastergroup) and may be either by short code or by route and system characters plus the mastergroup number on the carrier system.

**Note 1:** When route-system characters are used instead of short code identification, the first character is the route, the second character is the system, and the third character is the mastergroup; e.g., AC2 for the second mastergroup on the C system of the A route.

*sg* is the **supergroup** number.

*gr* is the **group** number.

*chan* is the **channel** number.

**Note 2:** If *sg*, *gr*, or *chan* (no more than two of these parameters) are assigned values of 0, multiple measurements will be made. For example, if *chan* = 0 then all channels in the specified group will be measured. If both *gr* and *chan* = 0, all channels in the specified supergroup will be measured. No more than 72 measurements will be made regardless of the number of zeros specified.

**Note 3:** For pilot measurements or supergroup noise measurements, no values for irrelevant parameters should be specified. For example, to measure a supergroup pilot, no *gr* or *chan* values should be given. To make a supergroup out-of-band slot noise measurement, parameter *sg* must be given but not parameters *gr* and *chan*.

*kHz* is the kilohertz value of an any-frequency measurement.

*Hz* is the hertz value of an any-frequency measurement (defaulted to zero if not required).

**2.03** The result of a measurement by the DMAN program is normally on one line and consists of the facility short code followed by the supergroup, group, and channel values, where appropriate; then the measurement result and dimension of the result. Dimension is the unit of measure; e.g., dB, dBm0, dBrc0, etc. However, pilots and 2600-Hz SF tones are given as deviations (in dB) from the expected level at the measuring point. For those measurements which are in reference to a pilot, the dimension is followed by /P. Dimensions for the various types of measurements were given in 2.02 under parameter *t*. A typical printout depicting a 1000-Hz test tone measurement at transmitting line access is given below:

801, 15, 4, 9, -0.2 DBM0

**Note:** For an any-frequency type measurement, the facility short code is followed by the frequency requested and the measurement result.

**2.04** Figure 2 illustrates printouts that result from measuring a supergroup 13, group 1 pilot at transmitting line access. In A of Fig. 2, the facility is identified by its short code (202); in B, the facility is identified by its broadband facility assignment (AC2) which indicates that the supergroup to be measured is in mastergroup 2 of the C system of the A route. The program converts either form of the command into the proper access point in the switch access network and the proper frequency at which to make the measurement.

#### DMAN Error Messages

**2.05** The following error messages may be printed when running the DMAN demand program. If error E006, E007, E010, or E011 occurs, the best measurement obtained is printed along with the error number. Other failures cause DMAN to terminate and the error code is printed.

MESSAGE	MEANING
DB01	More than 10-dB loss in reference path.
E003	Equipment failure.
E004	MG, SG, GR, or channel designation in error.

E005	Measurement type or access point in error.
E006	Signal below dynamic range capability of test set.
E007	Signal below programmed measurement range.
E008	Illegal short code or name.
E009	No access available at requested access point.
E010	SG pilot out of regulating range.
E011	GR pilot out of regulating range.
E012	User number out-of-range.

### 3. DATA-PHONE DEMAND MEASUREMENTS

**3.01** DATA-PHONE facilities can be used to make demand measurements from remote points in an office. The operator/CTMS interaction after the DATA-PHONE interconnection is established is the same as described for the DMAN program.

**3.02** A DATA-PHONE call can be made from the CTMS system teleprinter to distant offices through the use of an 801-type automatic dialer and a program called DIAL. This program causes the dialer to dial a telephone number entered by the operator, then it relays typed ASCII messages from the system teleprinter to the distant office and vice versa. Thus, the system teleprinter may be used in a manner equivalent to a teletypewriter connected directly to the DDD network.

**3.03** The DATA-PHONE connection is established to a distant office in the following manner. The DIAL program is called on with the command:

\*ON,DIAL[,p1,p2,p3 [,p4 ]]

#### Where:

*p1* is the numbering plan area code.

*p2* is central office code.

*p3* is station number.

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p4, if required, is special dialing digit; e.g., number 9 to access outside line.

Omit numbers not required for dialing. The area code, for example, can be omitted when dialing an office in the same numbering plan area (use two commas to maintain parameter positioning whenever a parameter is omitted). When connection is made to the distant office, the program responds:

DISTANT OFFICE CONNECTED

**3.04** The dialing method described above is preferred. However, the connection can also be established by a manual dialing procedure. This might be used, for example, if the automatic dialer is not functioning properly. The procedure then goes:

\*ON,DIAL

To which the program responds:

DIAL DISTANT OFFICE  
DIAL : PAUSE 0000

Dial the distant office using the dialing equipment on the data set. When the far end answers, press the data button and type:

\*GO,DIAL

When the connection is complete, the program types:

DISTANT OFFICE CONNECTED

**3.05** Once the connection is established, ASCII characters entered on the system teleprinter will be transmitted to the distant office, and ASCII characters received from the distant office will be printed. The operation of the BREAK key does not generate an ASCII character and will not be transmitted to the distant office.

**Note:** Do not attempt to type when there is continuous transmission from the distant office. Any characters entered at that time may not be transmitted and may be interpreted by the local computer as a request for operating system attention (indicated by an asterisk).

**3.06** Communication with a distant office should be terminated in an orderly manner. Calls

to an office for demand measurements, for example, should not be disconnected until the demand measurement program transmits a STOP message. When this occurs, the far end will also transmit an EOT character (simultaneous CTRL and D key operation) which will automatically terminate the DIAL program. The operator can also cause DIAL to terminate by typing an EOT character.

**Note:** The program should not be terminated by an off (OF) system command after a connection has been made to a distant office. If this is done, the local DATA-PHONE set will remain off-hook.

**3.07** The DIAL program will automatically disconnect calls established by automatic dialing. If the connection was manually dialed, the program issues the instruction:

DISCONNECT DISTANT OFFICE  
DIAL : PAUSE 0000

Disconnect by pressing first the TALK and then the AUTO buttons on the data set, then type:

\*GO,DIAL

DIAL concludes with:

DIAL : STOP 0077

**3.08** The DIAL program cannot be used when the local data line is busy, such as when a distant office is in the process of making demand measurements in the local office via DATA-PHONE service. However, if the local data line is idle, the DIAL program will automatically deactivate the DDD demand response program before dialing and will reactivate it after disconnecting.

**3.09** The following error messages may appear during the dialing operation when using the DIAL program:

MESSAGE	MEANING
CALL DID NOT GO THRU	May result from no answer or called station busy.
LOCAL DATA LINE BUSY	Local DATA-PHONE set or dialer may be off hook (not disconnected after previous call). Will also result if input call is in progress.

**ERROR IN PHONE NUMBER BY OPERATOR** One of several input errors detected by the program such as: (1) number(s) too large, (2) special digits or area code but no office code, or (3) special dialing digit is zero.

The program terminates after printing the error message.

**3.10** As a typical example, the DIAL program can be used to make demand carrier measurements in a distant office. To do this, the DIAL program is called on with the command:

```
*ON,DIAL,p1,p2,p3 [,p4 ]
```

Where the parameters are as defined in 3.03.

After dialing the program responds:

DISTANT OFFICE CONNECTED

Now, to activate the DDD demand response program, first strike the space bar. When the far end responds with an asterisk, type:

```
*ON,DMAN
```

The CTMS in the distant office responds:

DEMAND TEST DATE *xx time*  
INPUT:

Pass command parameters to the demand program in the distant office as described in 2.02. The measurement result is printed, along with identification of the point measured, and the distant program terminates with:

```
DMAN : STOP 0000
```

AN EOT character is transmitted from the far end with the stop message causing the DIAL program to terminate with:

```
DIAL : STOP 0077
```

#### **4. REMOTE CONTROL AND DISPLAY (RC & D) DEMAND MEASUREMENTS**

**4.01** The remote control units (RCUs) of the remote control and display system use the RC&D demand measurement program to make

single measurements of mastergroup, supergroup, and group pilots; spread; channel power; channel or supergroup out-of-band noise; and single-frequency tones. These measurements are initiated by the operator from any of a number of RCU locations in the office. Measurement results are indicated immediately to the operator by a readout device on the RCU. Repeat measurements can be made by using an operator identification number to automatically store measurement command parameters for reuse at a later time.

**4.02** The RC&D program is initially started for immediate response to a demand request made from an RCU by the command:

```
*ON,RC&D
```

The program is normally called on when CTMS is first activated and should ordinarily not be made dormant by an \*OF,RC&D command since a demand measurement via RCU may be called for at any time. However, the program must be called off before running the XRCD diagnostic program described in Section 103-260-500. After the diagnostic has been run, the RC&D program should be reactivated.

**4.03** The remote control and display system may have many RCUs attached to it. The system must be idle before attempting to input a request to the RC&D program. The busy condition is indicated by a lighted decimal point appearing in the upper-left part of the RCU readout. The decimal point lights when any RCU, including the local unit, is interacting with the computer.

**4.04** When the system is idle, a demand measurement command is initiated by keying in the first character on the TOUCH-TONE® pad of the RCU. The decimal point lights to show that control by the local unit has been achieved. Each digit entered is repeated on the readout for checking purposes. If an error is made while entering the request, the measurement can be restarted by striking the # key of the RCU. The restart is acknowledged by the appearance of an error code of E00.2 on the readout. The request can then be entered in correct form.

**Note:** Keys of the RCU should be pressed rather firmly when inputting information. A closure of at least 30 ms is required to register

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a character in the RC&D system. Rapid "pecking" at the keys can produce input errors.

**4.05** The \* key of the RCU is used as a separator between parts of a request in the same fashion that commas separate parts of a request made via teleprinter. Whenever the \* key is operated, the operation is acknowledged by a 2.0 displayed on the readout. The \* key is struck twice in succession (\*\*) to indicate the end of a measurement request.

**4.06** All other parts of the request consist of digits. It is, therefore, imperative that the short-code identification (a 5-digit maximum number) be known in order to make an RC&D measurement. Short codes for all accessible office facilities are printed as directories by data base management programs discussed in Section 103-260-301. These directories are also used with the DMAN program. Ready availability of directories is essential to making RC&D demand measurements.

**4.07** A time-out feature is built into the RC&D system to avoid having the system tied up for prolonged periods. Time-out occurs if more than approximately 20 seconds are used to input a request. This produces an error code of E00.1 on the timed-out RCU readout and the operator is dropped off the line.

**4.08** The RCU should be turned off when not in use. A switch at the base of the unit turns it off. Pressing any key activates the unit.

**4.09** The request format is as follows:

For all measurements except type 10:

$u*t*a*f* [ *sg [gr [chan ]]]**$

For type 10 (any frequency) measurements:

$u*t*a*f*kHz [ *Hz]**$

### Where:

$u$  is the assigned **user** (operator) identification number (enter 0 if unassigned or a repeat measurement is not desired).

**Note:** The range of operator numbers is 0–99 for a disc-based system and 0–39 for a tape-based system.

$t$  is a number to indicate the **type** of measurement to be made as follows:

- 1—pilot deviation in dB from nominal
- 2—channel power deviation in dB from nominal spread of 20 dB
- 3—channel power in dBm0 (wideband filter)
- 4—channel noise in dBrc0 adjusted for group pilot deviation
- 5—supergroup out-of-band noise in dBrc0 adjusted for supergroup pilot deviation
- 6—1000-Hz tone in dBm0 (narrowband filter)
- 7—2600-Hz tone deviation in dB adjusted for group pilot deviation (narrowband filter)
- 8—1000-Hz tone in dBm0 adjusted for group pilot deviation (narrowband filter)
- 10—any frequency in dBm0 (narrowband filter).

$a$  is a number to indicate the measurement **access** point as follows:

- 2—receiving line access
- 3—transmitting line access
- 4—receiving mastergroup access
- 5—transmitting mastergroup access
- 6—scanner supergroup output access
- 8—scanner group output access
- 10—group pilot secondary distribution bus access.

$f$  is the **facility** short code identification.

$sg$  is the **supergroup** number.

$gr$  is the **group** number.

$chan$  is the **channel** number.

$kHz$  is the kilohertz value of an any-frequency measurement.

Hz is the hertz value of an any-frequency measurement (defaults to zero if not required).

**4.10** To obtain a repeat measurement at a previously specified point, only the user number need be passed to the program. A new measurement is made immediately and displayed on the readout of the RCU. Repeat measurements using this simplified request form may be made to quickly determine the effect of gain adjustments or other maintenance activities. The simplified request is:

*u\*\**

**Where:**

*u* is the previously passed user identification number.

**4.11** It is also possible to change the type of measurement and/or the access point of a repeat measurement.

- To change the type of measurement, use:

*u\*t\*\**

**Where:**

*u* is the user identification number.

*t* is the new type of measurement.

All other information remains the same.

- To change the access point and (if required) the type of measurement, use:

*u\*t\*a\*\**

**Where:**

*u* is the user identification number.

*t* is the type of measurement (new or the same).

*a* is the new access point.

Again, all other information remains the same.

**4.12** It is possible to make repeat measurements that require change to some input parameter even farther along in the input message (beyond

the *t* and *a* parameters). This form of repeat measurement is of reduced advantage, however, since all parameters preceding the changed parameter must also be reentered. It is usually more straightforward to make such a measurement as a new, rather than a repeat measurement.

**Note 1:** In all cases of repeat measurements, stored parameters of the original measurement request are reused unless changed by the operator. If any parameter is changed, all parameters preceding the changed parameter must be reentered. This does not, however, change the remaining stored parameters and can lead to erroneous unintentional measurements.

**Note 2:** To reset to a mastergroup pilot, set *sg* to zero; to reset to a supergroup measurement, set *gr* to 1.

**RC & D Error Messages**

**4.13** The following error messages may appear on the RCU readout when running the RC&D demand program.

MESSAGE	MEANING
E00.1	RC&D system 20-second timeout.
E00.2	RC&D restart acknowledgement.
E00.3	Equipment failure.
E00.4	MG, SG, GR, or channel in error.
E00.5	Measurement type or access point in error.
E00.6	Signal below dynamic range capability of test set.
E00.7	Signal below programmed measurement range.
E00.8	Illegal short code or name.
E00.9	No access available at requested access point.
E01.0	SG pilot out of regulating range.

**Note:** This error code may also be obtained when making a noise measurement (type 4 or 5 measurement) at scanner access (access point 6). This is because the program checks the SG pilot as part of the noise measurement and may find it out of regulating range.

- E01.1 GR pilot out of regulating range.
- E01.2 User identification number out of allowable range.

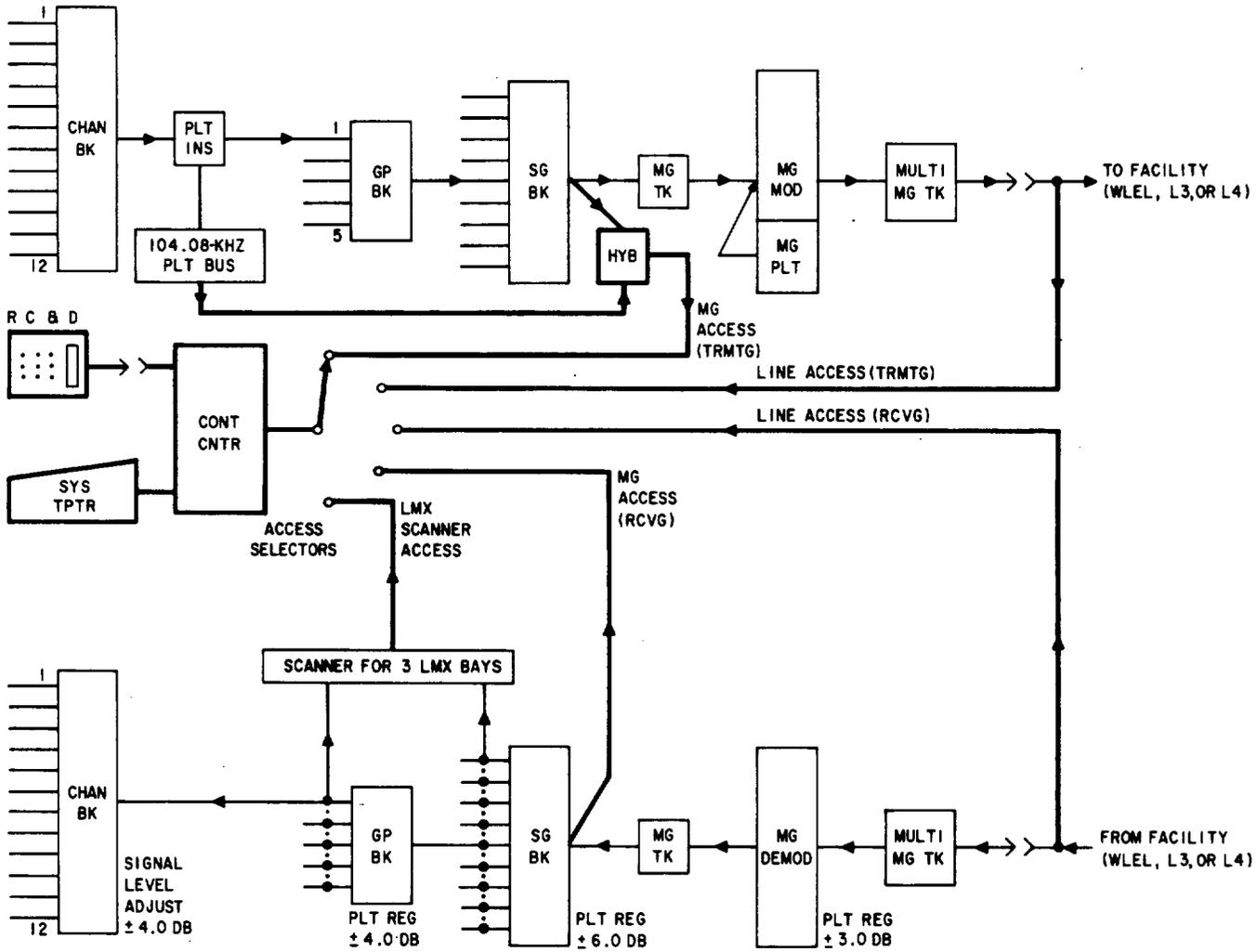


Fig. 1—CTMS Access Arrangement

\*ON, DMAN

DEMAND TEST DATE 183 9:39  
 INPUT: 0,1,3,202,13,1  
 202,13,1 -0.1 DB  
 DMAN : STOP 0000

\*ON, DMAN

DEMAND TEST DATE 183 9:40  
 INPUT: 0,1,3,AC2,13,1  
 202,13,1 .1 DB  
 DMAN : STOP 0000

A. FACILITY SHORT CODE

B. FACILITY BFA ASSIGNMENT

Fig. 2—Facility Identification