AM8e T1 Adapter
Model 300071
ed with Model AM8 PCM/VF call analyzer)

Instruction Manual

Revision D
April 11, 1997

Technical Data Subject to
Change without Notice

Ameritec
CORPORATION

of this
art

Record of Revisions

:mber 16, 1993	Original Release for 300068 units
uary 4, 1994	Add information on the Model 30071 unit which provides for conversion between A-law and μ-law Speech Encoding. Shaded text identifies descriptions that apply only to the Model 300071.
7, 1994	Model 300068 discontinued. Manual is for Model 300071 only which retains all features of Model 300068. Shading and references to two models removed. Corrected Figure 2. Other corrections as needed.
l 11, 1997	Corrected part number on title page to read 18-0053. Updated document format.

al was produced on a Power Macintosh using MS Word 6.0 and Canvas 3.0.
s were printed in EPSF format.

Index

ıUCTION

ual is intended for use with the Ameritec AM8e T1 Adapter (P/N 30-0071).
ıual should be used in conjunction with the AM8e PCM/VF Call Analyzer
n Manual (P/N 18-0035), and the AM8e Protocol Table Development Guide
ı040).

ıual is divided into two major sub-sections, as listed in the Table of Contents.
section ("1. INTRODUCTION") provides an overview of the AM8e VF Call
. AM8e T1 Adapter and Protocol Table Development Guide; all of which are of
ıtal importance to the instructions in this manual.

ıd section ("2. OPERATION OF THE T1 ADAPTER") describes the Model 30-
8e T1 Adapter, its front panel, connections, setting up operating conditions and
ımmands.

ıf Contents and an Index to subjects are at the beginning of this manual.

PCM/VF Call Analyzer

meritec AM8e PCM/VF Call Analyzer is a test set that is designed to emulate, r and analyze signaling activity at the PCM interface point on an established tion.

: For brevity, the AM8e PCM/VF Call Analyzer will be referred to as the "AM8e nalyzer" in the remainder of the text.

M8e Call Analyzer can emulate or monitor and identify activities at the near end : far end (Rx) of either of two 2.048 Mbps PCM spans. This unit is described in the l AM8e PCM/VF Call Analyzer Instruction Manual" (P/N 18-0035).

an be performed on any of 30 voice channels on the spans, and the AM8e Call er may operate with any selection of one of eight signaling protocols stored the unit.

ight protocols may be loaded into the AM8e Call Analyzer, either from the factory user with an MS/DOS Compatible PC. The user may develop custom protocols to m to local standards, as described in the "AM8e Protocol Table Development
.

gh the AM8e Call Analyzer can test 2.048 Mbps E1 spans, it is not specifically ed for direct connection to 1.544 Mbps T1 spans; therefore, Ameritec has ped the T1 Adapter.

˙1 Adapter

071 AM8e T1 Adapter is designed to replace the front cover (or "Lid") of the
ill Analyzer. The illustration on the cover of this manual shows both units as
ld be set up for use.

or brevity,the Model 30-0071 AM8e T1 Adapter will be referred to as the "T1

.dapter is electrically connected to the AM8e Call Analyzer via a ribbon cable
"TO AM8e LINE/TIMS" connector on its front panel to the LINE/TIMS
˙ on the rear panel of the AM8e Call Analyzer. All power, PCM1, PCM2 input
it connections between the T1 Adapter and the AM8e Call Analyzer are via this
˙.

faces between the 1.544 Mbps T1 spans are via bantam jacks on the front panel
 Adapter.

ılly, the T1 Adapter converts (or "maps") the 24 signaling and data channels of
| Mbps T1 spans (PCM1 and PCM2) to the first 24 signaling and data channels
48 Mbps PCM1 and PCM2 Rx and Tx interfaces on the AM8e Call Analyzer. It
ides conversion between A-law and μ-law speech encoding.

---

annels 25 through 30 are not accessible and are used for control communication
ween the T1 Adapter and the AM8e Call Analyzer.

Protocol Table Development Guide and Disk

/8e Protocol Table Development Guide (P/N 18-0040) is a user's guide to
)ing custom signaling protocols for the AM8e on an MS/DOS-compatible
il Computer. Also included with the Guide is a Development Disk which must be
gether with third-party software as described in the Guide. Custom protocols are
d to monitor and emulate 1.544 Mbps spans via the T1 Adapter.

In TABLE A-2 of the AM8e Protocol Table Development Guide: Action Data
AC_ADAPTER Action Code is amended to include "2 = T1 Adapter" in order to
he 30-0071 T1 Adapter.

y cases, Ameritec has developed protocols which may be supplied on a disk (or
:d with the AM8e Call Analyzer). Protocols are listed in an Addendum to the
P/N 18-0126). For more information contact your local Ameritec Sales or
ients Group representative.

·view of T1 Test Configuration

a T1 circuit, the Switch or Terminal under test is connected to the PCM1 and/or
jacks on the front panel of the T1 Adapter. Line connections are described in
detail in sub-section 2.3.

IATION OF THE T1 ADAPTER

nt Panel Controls and Indicators

e 1 shows the front panel of the T1 adapter. The following sub-sections ibe the controls and indicators.
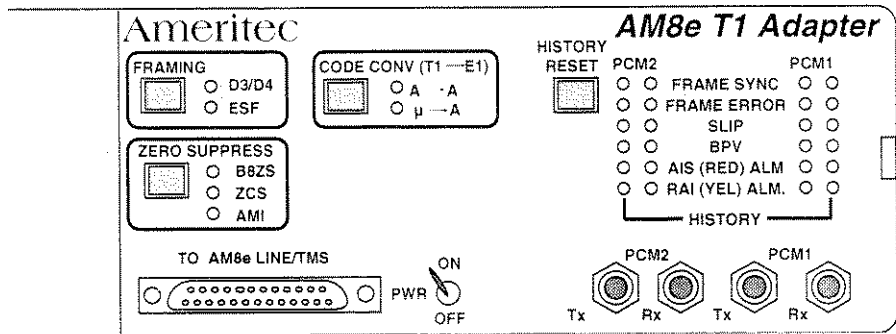
Figure 2-1. Model 30-0071 AM8e T1 Adapter Front Panel

R ON OFF — Power ON/OFF Switch:

switch allows you to turn the power on and off.

Power (+16V) is provided by the AM8e Call Analyzer which must also be turned ON. The cable between the AM8e Call Analyzer and the T1 Adapter must also have been connected (Refer to 2.2.1).

April 11, 1997

AMING switch and indicators — Span Framing pe Selector

; switch allows you to select the span framing type:

)4 Uses 12 separate frames in a super-frame. The signaling bits are identified as "a" and "b"; "c" and "d" bits are not used.

Extended Super Frame uses 24 frames rather than 12 frames. Its signaling bits are identified as "a", "b", "c" and "d".

> NOTE: In an ESF frame, the a, b, c and d bits cannot be all zeroes (0000).
> Even though the ESF framing standard permits it, the AM8e Call
> Analyzer will not synchronize to an all zero ESF frame after
> conversion to E1.

ı may change the framing type by pressing the FRAMING switch until the red framing type is reached. The selected type is indicated by a lighted LED de the D3/D4 or ESF label.

RO SUPPRESS switch and indicators — Handling -zero data pattern

; switch allows you to select the way that the T1 Adapter handles a data ern of all zeroes during transmission on the T1 side:

S   Binary Eight Zero Suppression will insert two bipolar violations (BPVs) when seven consecutive zeroes are encountered. The receiving equipment will recognize this, remove the bipolar violation and correctly interpret the data.

Zero Code Suppression will insert a "1" bit to prevent the transmission of eight or more consecutive "0" bits.

Alternate Mark Inversion is the standard protocol for T1 Spans. AMI does not supply any zero suppression conversion.

/1 and PCM2 indicators— Active Status of PCM
nals

ies of six LEDs indicate the current status of the T1 PCM signals. These
; are on either side of the labels for the various conditions indicated.

E SYNC: This LED is lighted until the T1 has synchronized to the
                     received data stream. When synchronization is achieved,
                     the LED goes off.

E ERROR: This LED is lighted when the T1 Adapter detects four
                     errors in the frame bit pattern. If there is no error
                     encountered for five seconds, the LED will turn off.

                     This LED is lighted when the T1 adapter detects a slip
                     condition. A slip is commonly due to buffer overflow or
                     underflow of the network equipment. If there is no slip
                     encountered for five seconds, the LED will turn off.

                     This LED is lighted when the T1 Adapter detects 256 or
                     more bipolar violations. If there is no BPV for five
                     seconds, the LED will turn off.

IED) ALM: This LED is lighted when the T1 Adapter detects an
                     "All-Ones-Signals" RED alarm condition or detects two
                     frames of all-ones and an out-of-frame condition. The
                     LED remains while the condition exists.

'EL) ALM: This LED is lighted when the T1 Adapter detects a
                     "Remote Alarm Indication" YELLOW alarm condition
                     or detects a sequence of eight one's and eight zeroes in
                     the Facility Data Link bit position. The LED remains
                     lighted while the condition exists.

M1 and PCM2 HISTORY indicators — History
atus of PCM Signals

outer LEDs are lighted when one of the active indicators is first lighted.
ike the active indicators which go out automatically, the history status LEDs
ain lighted until you press the HISTORY RESET switch.

STORY RESET switch. — Reset History Status

er to 2.1.5, above.

)DE CONVersion T1 —> E1 switch and indicators
Selecting Speech Encoding

s switch (located between the FRAMING and HISTORY RESET switches)
ws you to select the speech encoding conversion:

> A   A-law to A-law conversion passes speech samples through the unit
       in both directions without any conversion.

-> A μ-law to A-law conversion converts μ-law speech samples from the
       T1 circuit under test to the A-law tones required by the AM8e Call
       Analyzer. The AM8e Call Analyzer originates A-law speech samples
       which, are converted back to μ-law by the T1 Adapter.

nnection to the AM8e Call Analyzer

AM8e LINE/TIMS — AM8e Interface Connection

is a DB-25 male connector, shown in Figure 1, where the 25-pin female
ector of Cable 48015600 (supplied with the unit) is connected.

other end of this cable has a 24-pin ribbon connector which connects to the
E/TIMS connector on the rear panel of the AM8e Call Analyzer. The signals
by the T1 Adapter are as shown in Figure 2 (pin numbers at the AM8e Call
yzer and the T1 Adapter connectors are also shown)

NAL	AM8e	Adapter	SIGNAL	AM8e	Adapter
12–R1	1	1	LID-R1	9	5
12–T1	2	14	LID-T1	10	18
12–R	3	2	LID-R	11	6
12–T	4	15	LID-T	12	19
11–R1	5	3	Gnd	21	11
11–T1	6	16	Gnd	22	24
11–R	7	4	+16 V Power	23	12
11–T	8	17	+16 V Power	24	25

Table 2-1, Signal Connections

n: Power should be turned OFF on the AM8e before making this
    connection.

n: When using the LINE/TIMS connector as a connection point from the
    AM8e Call Analyzer to the C.O. for PCM or LOOP signals (when not
    using the T1 Adapter), BE SURE THAT PINS 23 and 24 are NOT
    connected to C.O. ground.

These connections were not provided in early AM8e Call Analyzers, and
Figure 7 - 18 in the Model AM8e PCM/VF Instruction Manual (March 1992
issue) shows pins 9 - 11 as unused, and pins 23 and 24 as extra C.O.
GROUNDS. The latest October 1993 issue shows the connections for the
T1 and other adapters.

nections to Test Leads

nections for the PCM1 and PCM2 Rx and Tx interfaces may be made with
of the three types of cables which have a bantam connection on one end and
antam plug, type 310 plug, or clip leads on the other end.

re 6-1 in the AM8e Call Analyzer manual (AM8e Instruction Manual, 18-
5) shows the three types of cables. Figure 6-3 in the AM8e Call Analyzer
ual shows the signals that appear on the tip, ring and sleeve of each jack
:h may be connected.

TE: Substitute the PCM1 and PCM2 jacks on the T1 Adapter for those shown
he AM8e Call Analyzer. Channels are limited to 1 - 24 rather than 1-30.

:ing the Operating Conditions

1 the AM8e Call Analyzer and T1 Adapter must be configured correctly for
T1 Signal characteristics. The basic steps for setting up, connecting and using
T1 Adapter follow:

Remove the Signaling Adapter from the front of the AM8e Call Analyzer by
opening the holding clips on either side and set it on top of or beside the
AM8e Call Analyzer.

After verifying that the AM8e Call Analyzer is turned OFF, connect the
48015600 Ribbon Cable (supplied) between the "TO AM8e LINES/TIMS"
connector on the T1 Adapter and the LINE/TIMS connector on the AM8e
Call Analyzer.

0053-S02.D__48

ˈurn ON the AM8e Call Analyzer and the T1 Adapter. LED indicators
ʰould indicate the settings for FRAMING and ZERO SUPPRESS. The
ˈRAME SYNC indicator also will be lighted until the unit synchronizes to
ʈe incoming (Rx) T1 signal.

ˈet FRAMING and ZERO SUPPRESS on the T1 Adapter to match the
ʰaracteristics of the T1 equipment under test (refer to 2.1.2 and 2.1.3).

> ʃote: The ESF Framing standard allows all signalling bits to be zeroes;
> however, the AM8e Call Analyzer will not synchronize to an ESF
> Framed signal with all signaling bits equal to zero after conversion to
> E1.

ʃlake the PCM1 and (if used) the PCM2 Rx and Tx connections between the
ʈbelled jacks on the T1 Adapter and the T1 equipment. For emulation by
ʰe AM8e Call Analyzer, disconnect through-connections (if not done by
ɜst jacks) at the CO. For monitoring, leave the connections in place.

IOTES:

.   When the AM8e Call Analyzer is to monitor the signal, it is expecting
    the Master clock via the signal connected to the PCM1 Rx jack on the T1
    Adapter. The signal for the opposite direction must be connected to the
    PCM2 Rx jack on the T1 Adapter.

ι. For further guidance to making Emulate or Repeat (Drop and Insert)
    connections refer to Figure A–6 in the AM8e Call Analyzer Instruction
    Manual, and substitute the PCM1 and PCM2 jacks on the T1 Adapter for
    those shown on the AM8e Call Analyzer. Internal channels are limited to
    1 - 24 rather than 1-30.

Set the following AM8e Call Analyzer parameters:

IMITATE	"te/line" or"switch" (not significant for PCM operations)
ANALOG/PCM	"pcm int clk" (Internal Clock) The AM8e Call Analyzer will generate the clock for PCM framing information. In this case, the AM8e Call Analyzer acts as a "Master" via the PCM1 or PCM2 Tx jack on the T1 Adapter.
	"pcm loop clk" (External Clock) The AM8e Call Analyzer uses the PCM signal it receives from the PCM1 Rx jack on the T1 Adapter.
PROTOCOL	select the protocol appropriate for the T1 requirements at the test location.
INPUT	PCM1 and/or PCM2
Channel	1 - 24, as needed. Channels 25 - 30 are not accessible; they are used for communication between the T1 Adapter and the AM8e Call Analyzer.

To set up other parameters and perform tests, follow the procedures in the "Model AM8e PCM/VF Call Analyzer Instruction Manual" (18-0035).

The T1 Protocol may automatically set the AM8e Call Analyzer parameters. If you have any further questions in setting up the test configuration, applications help is available from 8 AM to 5 PM Pacific Time by contacting Customer Service at the address or phone numbers on the title sheet of this manual.

---

note Control of T1 Adapter

'1 Adapter may be configured directly through the use of the front panel VIING, ZERO SUPPRESS and HISTORY RESET and CODE CONVersion hes or remotely through a terminal connected to the AM8e Call Analyzer's 2 port. A command is used for setting each switch and another command is to read the conditions that have been set up.

1ote Setup ((ADP=xyz) command)

T1 Adapter switch can be set remotely through the use of the following 1and:

'=xyz)   x must be 2 for T1 Adapter

y = switch

z= switch selection as shown below:

	then z
raming	0 = d3/d4
	1 = esf
ero suppress	0 = b8zs
	1 = zcs
	2 = ami
ode conversion	0 = A -> A
	1 = μ —> A
istory reset	0 - 9 (don't care)

1 example, the following commands would select ESF framing, AMI Zero :ession, conversion betwen μ–law and A–law encoding and reset the history ;.

     (ADP=201)(ADP=212)(ADP=221)(ADP=230)

                                          April 11, 1997

ｍote Status ((RADP) command):

settings of the T1 adapter switches (excluding the HISTORY RESET) and
error message status can be read remotely through the use of the following
ｉmand and response:

ｉmand		response
ｉDP)	ADAPTER STAT	= fzc (as shown below)
	PCM1 CURRENT	= nnnnnn
	PCM1 HISTORY	= nnnnnn
	PCM2 CURRENT	= nnnnnn
	PCM2 HISTORY	= nnnnnn

ｒRAMING	z = ZERO SUPPRESS	c = CODE CONV
D3/D4	0 = B8ZS	$0 = A \longrightarrow A$
ESF	1 = ZCS	$1 = \mu \longrightarrow A$
	2 = AMI	

As an example, the setup status for D3/D4 framing type, AMI zero
suppression, μ–law to A-law conversion setup; and LED status showing non-
synchronized channels, no current errors and un-reset history (all errors have
occurred before the command was given) would be:

(RADP)	ADAPTER STAT = 021
	PCM1 CURRENT = 100000
	PCM1 HISTORY = 111111
	PCM2 CURRENT = 100000
	PCM2 HISTORY = 111111

NICAL SPECIFICATIONS

Interface

PCM1 and/or PCM2)

.544 Mbps Pulse Code Modulation (PCM)

mulation and Monitoring of User Protocol Definable circuit type (Protocol elected in AM8e)

wo span ports provided to support drop and insert channel (Repeat elections in AM8e)

raming D3/D4, ESF

ero Suppresion: AMI, B8ZS, ZCS

)igital Channel Coding: μlaw, A-law

npedence: 100 Ω at 1.544 Mbps BiPolar PCM (860 Ω padded cables applied for monitor mode)

:M1 and PCM2 Transmission Error Indicators

\ME SYNC   This LED is lit until the until the T1 has synchronized to the recieved data stream. When synchronization is achieved, the LED goes off.

\ME ERROR   This LED is lit when the T1 Adapter detects four errors in the frame bit pattern. If there is no error encountered for five seconds, the LED will turn off.

P   This LED is lit when the T1 adapter detects a slip condition. A slip is commonly due to buffer overflow or underflow of the network equipment. If there is no slip encountered for five seconds, the LED will turn off.

/   This LED is lit when the T1 Adapter detects 256 or more bipolar violations. If there is no BPV for five seconds, the LED will turn off.

(RED) ALM   This LED is lit when the T1 Adapter detects an "All-Ones-Signals" RED alarm condition or detects two frames of all-ones and an out-of-frame condition. The LED remains while the condition exists.

(YEL) ALM   The LED is lit when the T1 Apadter detects a "Remote Alarm Indication" Yellow alarm condition or detects a sequence of eight one's and eight zeroes in the Facility Data Link bit position. The LED remains lit while the condition exists.