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Ameritech Scan-Alert Transport Service Deployed With Applied Spectrum Technology

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1. Introduction

1.1. General

This document describes the technical interface specifications for Ameritech Scan-Alert Transport Service, hereafter called Scan-Alert, in those AOCs using Applied Spectrum Technology. Specifications are provided for two points of interface for the service, the Alarm User Interface (Section 3.0)and the Alarm Service Provider Interface (Section 4.0).

This Technical Reference is complete and accurate to the extent of the completeness and accuracy of the information furnished to Ameritech Services by Applied Spectrum Technology. As such, errors of content and omission may be found. Ameritech Services will attempt to correct any such errors and to resolve any confusion or uncertainty associated with this Technical Reference.

1.2. FCC Rules

Part 68 of the FCC Rules requires that all terminal equipment which connects with the public switched network must be registered in compliance with Part 68. The compatibility specifications provided in this document are believed to be either in compliance with, or not subject to, Part 68 requirements; however, it is the responsibility of the manufacturers of the equipment described in this Technical Reference to make final determination as to compliance with Part 68. FCC regulations prohibit the use of this device(s) on coin service or party line service.

The terminal equipment described herein is also believed to be regulated under Part 14 of the FCC Rules covering Radio Frequency Interface. Terminal equipment must comply with rules established for Class B computing equipment.

2. Scan-Alert Service Description

2.1. Purpose

Scan-Alert is one of the AOC's alarm transport offerings. Scan-Alert is a data transmission service designed to transmit data signals over existing networks. The data signals are transmitted in the bandwidth of 14 Hz to 2750 Hz. Scan-Alert differs from other offerings in that it employs the alarm user's exchange access line. Scan-Alert consists of two interfaces to the network, the Alarm User Interface and the Alarm Service Provider Interface. (Refer to figure 1).

2.2. Capabilities

Scan-Alert is designed to accept a number of different alarm signals from an alarm user's alarm panel, and deliver these signals to an alarm user's pre-subscribed alarm service provider

location via the AOC provided network connection. Any change in the monitored alarm points status at the Customer Premise Equipment (CPE) is immediately transmitted to the AOC's central office and in turn to the Alarm Service Provider.

The Scan-Alert service is provided using a method that emits a spread spectrum signal over ordinary metallic loop to the AOC's central office. The transmission does not interface with the simultaneous use of the telephone line for voice or data signals.

The transmission link is initiated by Customer Alarm Unit (CAU) CPE that is connected to the alarm control panel at the customer premises. The AOC receives the alarm transmission at the AOC's central office and switches the information to the appropriate alarm company central station.

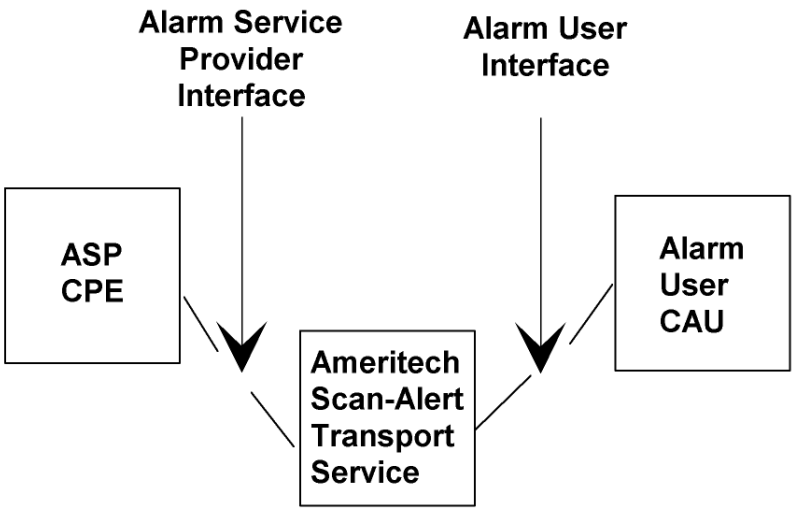
The CAU provides eight transmission ports on a single channel for fire, intrusion, medical and panic alarms, etc. when linked with appropriate control panels and customer alarm unit options. These ports can be interfaced with any latching device. A latching device is defined as one that can hold its electrical state until instructed to reset. For example, an alarm is triggered when a door is forced open. A latching circuit will hold the alarm active after the door has been closed. It will remain latched until the alarm is manually or electrically instructed to reset. The latching circuitry can be independent circuit or part of an alarm control panel.

Scan-Alert is provided through a one-way continuous transmission channel between the customer's premises and to AOC's central office. The absence of signal on this transmission channel will result in an alarm being sent to the alarm service provider.

2.3. Limitations

Scan-Alert service requires CPE that conforms to specific electrical and protocol specifications covered in this document. Scan-Alert using Applied Spectrum, Inc. technology is only available in selected locations in AOC territory. Since some AOCs' access facilities will not support this

service (it can only be deployed on metallic facilities for the CAU), it may not be available on all access lines in a given area. contact AOC for a listing of current and contemplated wire centers.



3. Alarm User Network Interface

3.1. General

The Network Interface (NI) is the point of connection between the AOC central office equipment (COE) and the equipment provided by the customer. Scan-Alert makes use of a loop-start exchange access line. The NI of the exchange access line is also the NI of Scan-Alert. The specifications of this interface are described in Bell Communications Research, PUB 61100, Description of the Analog Voiceband Interface between the Bell System Local Exchange Access Lines and Terminal Equipment, January 1983 (If you desire to order this or any other document, please contact the APEx Help Desk at (847) 248-4324.

3.2. Customer Alarm Unit

Scan-Alert makes use of the CAU that converts alarms into signals to be applied to the alarm user's exchange access line. the CAU is connected in parallel with other CPE on the customer side of the NI.

3.3. Ringer Equivalence Number

FCC Part 68.312 defines on-hook impedance limitations. It develops a parameter which is an inverse function of on-hook impedance, called the Ringer Equivalence Number (REN). Since the CAU is bridged to the access line, the impedance of all other connected CPE must be

known and taken into account. It is recommended that Scan-Alert CAU be capable of successful operation when bridged with other CPE having a cumulative REN of 5.0.

3.4. Transmission Requirements

The CAU is located at the customer premises. The CAU's function is to provide the communications interface for transmitting data from the customer premises to the AOC's central office. Scan-Alert expects the following transmission requirements from the CAU:

Bridging impedance: 100 K Ohms resistive on-hook and 4k Ohms (with 8 Vdc tip-to-ring) resistive Off-hook.

Line connection: RJ11.

Line current required: 0.5 mAdc On-hook (typical) and 2.7 mAdc (typical) Off-hook.

On-hook tip-to-ring voltage: Between 22 Vdc and 60 Vdc.

Off-hook tip-to-ring voltage: Between 3.5 Vdc and 18 Vdc.

C message frequency response characteristics: Required of customer premises equipment.

Connection of a CAU to a customer's Access Line, may affect the operation of certain modems and ancillary equipment necessitation the provision of line isolation equipment.

3.5. Longitudinal Balance

Longitudinal Balance provides a measure of the susceptibility of a unit to longitudinal voltages induced principally from AC power lines (see PUB 61100). A poorly balanced unit will cause more longitudinal-to-metallic signal conversion (L-M) than will a well balanced unit, resulting in higher noise levels with a corresponding degradation of service quality. The longitudinal-to-metallic coefficient in dB, is defined as:

$$\text{Balance (L-M)} = 20 \log \frac{E_1}{E_m}$$

Where: E_1 **= applied longitudinal voltage.**

E_m **= resultant metallic voltage.**

Longitudinal Balance should be greater than 63 dB at 1 kHz.

Measurements should be made in accordance with IEEE Standard 455-1976.

3.6. Noise

The minimum signal to noise ratio received at the NI will be 15 dB. (This assumes a C message weighting characteristic, as defined in Bell Communications Research document, Subscriber Loop Transmission Test Set, PUB 55020.)

3.7. Environmental Factor

The electrical connection between the NI and the AOC COE is normally made via wire pair facilities. These facilities cover an environment where they are subject to disturbing influence from several electromagnetic sources. The possibility of such influence must be considered in the design of terminal equipment.

(The voltages and currents that may appear at the NI as a result of these influences are described in Bell Communications Research Document No. TR-EOP-000001, Lightning, Radio Frequency, and 50 Hz Disturbances at the Bell Operating Company Network Interface, June 1884.)

4. Alarm Service Provider Network Interface

Alarm data transmitted includes customer identification number, alarm number and condition. Scan-Alert data link protocol and internal network signaling will support the reporting of up to eight different alarm signals. The alarm number transmitted identifies the zone alarm of 01 to 08. Additionally three status alarms are supported. These status alarms are defined as:

17 Loss of Signal between CAU and COE

#23 CAU Identification Number Has Changed

#24 Central Office Module Card Failure

The following information describes the transmission requirements of the Alarm Service Provider Network Interface.

Battery: -42 to -56 Vdc (Central Office Modems require 110 Vac).

Bridging impedance: 2.2 Megohms.

Line: Single Party metallic pair, loaded or unloaded, loop start.

Subscriber Loop: 0 - 2000 Ohm with a 400 Ohm (typical) DC switch battery feed resistance.

Longitudinal voltage: 30 Vac rms 60 Hz maximum.

Voiceband line attenuation: Less than 10 dbm at 1 kHz.

Ringing voltage off time: Must equal or exceed 3.0 seconds between rings.

5. CAU Alarm Reporting

5.1. Description of Signaling Capabilities

The communication from the AOC's COE to the ASP can be either via a polling or dial-up architecture. the COE/ASP communication is two-way, providing for acknowledgment alarms.

5.2. Dial-Up Architecture

The information that is delivered by Scan-Alert to the alarm company central station is an ASCII format. The data consists of the customer identification number and the alarm condition. The alarm condition for the dial network is identified as an "S" (set) or "C" (clear). "S" signifies alarm initiation, and "C" signifies alarm restoration (removal of alarm condition). The alarm reporting format is as follows:

CUSTOMER IDENTIFICATION NUMBER	ALARM ZONE	ALARM CONDITION
AAAAAAAAAA	NN	X

WHERE: AAAAAAAAAA = 10 Digit identification number (typically a phone number)
NN = Zone Alarm (1-8) or status alarm (17, 23, 24)
X = Alarm Condition (S = Set) (C = Clear)

Typical alarm transmission could appear as follows:

6125551212-01 S

At the completion of each transmission, an acknowledgment must be transmitted back to the AOC. This acknowledgment must be single character DC2 (this is Control R).

The specific protocol is as follows:

SPECIFICATION	PROTOCOL	
ASCII Word Structure	Transmit	= 1 stop = 1 start bit = 8 start no parity (7 bit space parity)
	Acknowledgement	= 8 bit (no parity) or 7 bit (any parity)
Alarm Message	The ASP receives the following ASCII sequence: NULL NULL NULL NULL NULL SPACE Ten digit account number - (dash) Ten digit alarm number SPACE S (alarm set) or C (alarm clear) CR LF BELL BELL Next alarm message immediately follows until all pending messages are transmitted (125 max.)	
Acknowledgement	Message is acknowledged with ASCII Character DC2 (Control R)	
Transmission Termination	Transmission is terminated after acknowledge or 30 seconds with ASCII EOT character.	
Alarm Report Sequence	Five attempts are made with the main phone number, and five attempts are made with the backup number. If no backup number is provided on the Memory Module, ten attempts will be made on the primary number.	

5.3. Polling Architecture

The Poll System utilizes a Bell Type 108 (300 baud) or Bell Type 202/212 (1200 baud) or equivalent modem for transmission media.

The sequence is initiated by a polling computer which addresses the telco equipment by transmitting this byte: (1) (7 BIT ADDRESS).

The information that is delivered to the alarm company central station is in binary format. The data is transmitted asynchronously as 8 bits. There is no parity bit but 1 start and 1 stop bit are appended.

At the completion of a sequence, an acknowledgment must be transmitted from the alarm company central station to the central office equipment if the alarm data was received correctly. This acknowledgment must be the byte: (0) (7 BIT ADDRESS). If the central office equipment does not receive an acknowledgment to an alarm it will wait for another poll and retransmit the same alarm information. If the central office equipment does not complete a correct alarm report sequence within 4 minutes 45 seconds of receiving the alarm, a local alarm within the telco central office will be set.

FROM CAU SITE

POLL = 1X0XXXXX

Shelf address
(Hex 00 – 1F)
Not Used
Shelf Port
(Port 1 = 0, Port 2 = 1)

POLL EXAMPLE:
Port 1 = Hex 80 – 9F
Port 2 = Hex CO · DF

FROM COE SITE

ALARM REPORT:

Byte 1 = Shelf address
Port 1 = Hex 00 – 1F
Port 2 = Hex 40 – 5F

Byte 2 = Channel number
Hex 01 – 60
(00 if no alarms)

Byte 3 = Alarm status
Zone alarm:
Set = Hex 8X
Clear = Hex 0X
(X = alarm zones)
LOS alarm:
Set = Hex 91
Clear = Hex 11
RM address alarm:
Set = Hex 97
Clear = Hex 17
COM channel fault:
Set = Hex 98
Clear = Hex 18

Byte 4 = Checksum
(Byte 1 + Byte 2 + Byte 3)
MOD 256

ACKNOWLEDGE = 0X0XXXXX

Same as POLL

ACKNOWLEDGE EXAMPLE:
Port 1 = Hex 00 – 1F
Port 2 = Hex 40 – 5F

```
POLL:
Determine next poll address
Raises RTS
Waits for CTS
Sends Poll Byte
Starts timeout = 500 mSec
Drops RTS

RCV:
If correct Address byte received
        Receives Channel byte
        Receives Zone byte
        Receives Checksum

        If Checksum Verifies

                If Channel byte is not 0
                        Raise RTS
                        Wait for CTS
                        Send ACK byte
                        Drop RTS
                        Process alarm

        Goto POLL

If timeout
        Goto POLL

Else
        Goto RCV
```